TECHNOLOGY DEPT.

Telephone ENGINEER and MANAGEMENT

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JULY, 1945

Featuring

THE RURAL LINE NOISE PROBLEM

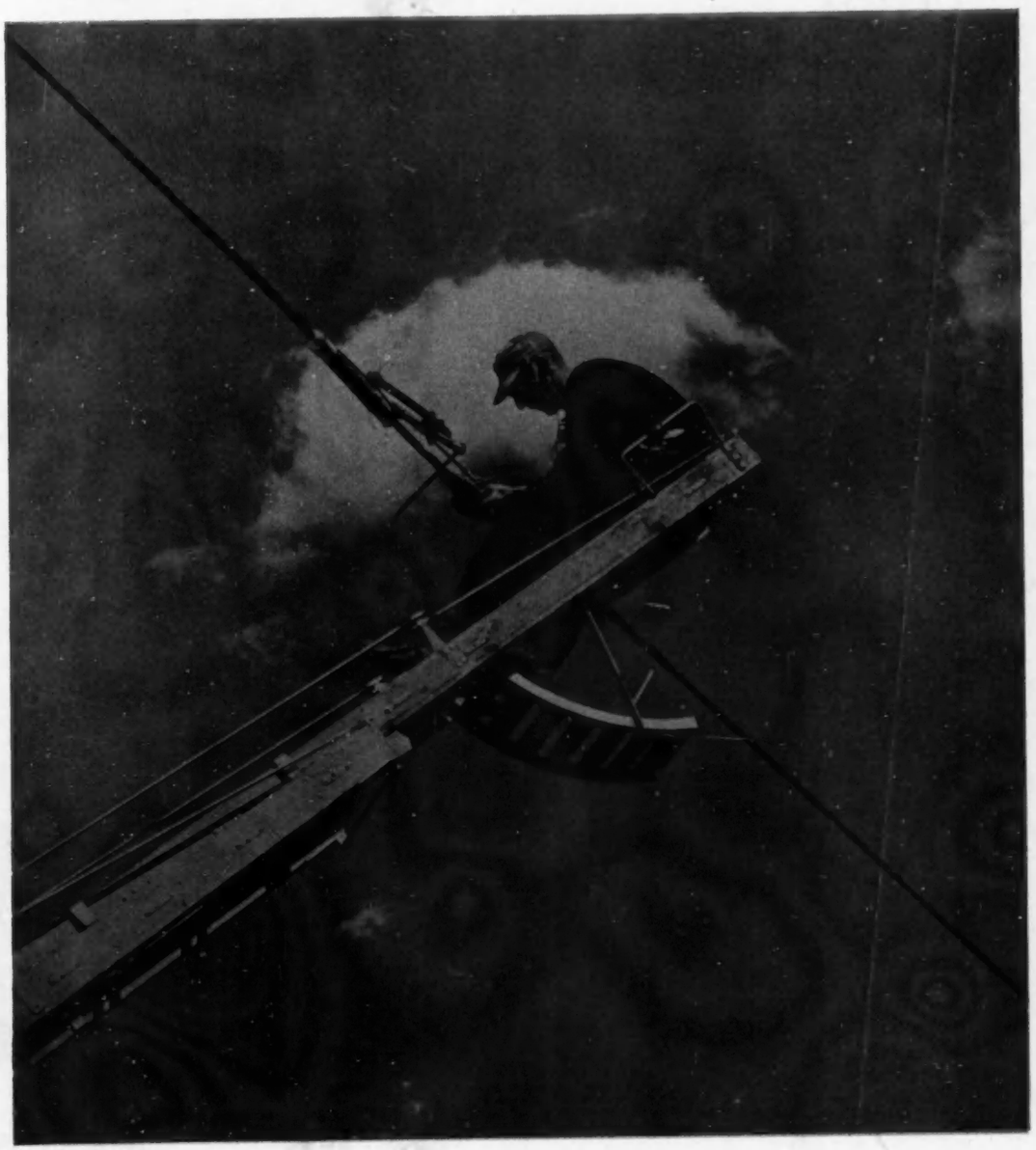
•

THE COVER PICTURE—

"Cable Splicing in the Clouds," a salon photograph, is the work of G. H. Rowe of the Colorado plant department of The Mountain States Telephone & Telegraph Company.

•

VOLUME 49, NUMBER 7. Published monthly by Telephone Engineer Publishing Corporation. Office of Publication, Pontiac, Illinois. Executive and Editorial Office, 7720 Sheridan Road, Chicago, Illinois. Subscription: U. S., Cuba, Mexico, $1.50 per year; Canada $2.00, in all other countries, $3.50. Single copies, U.S.A. 15 cents; single copy JANUARY 15 BLUE BOOK BUYER'S GUIDE $1.00. Entered as second class matter at the post office at Pontiac, Illinois, under the act of March 3, 1879.



THE MAGAZINE OF THE TELEPHONE INDUSTRY

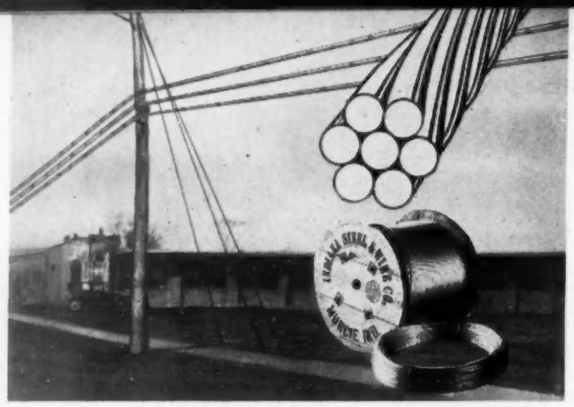
LOOK to . . .
ACORN Ins
DAMPROOF DUCT WIRE
500 FEET

LEICH

FOR INSULATED TELEPHONE WIRES

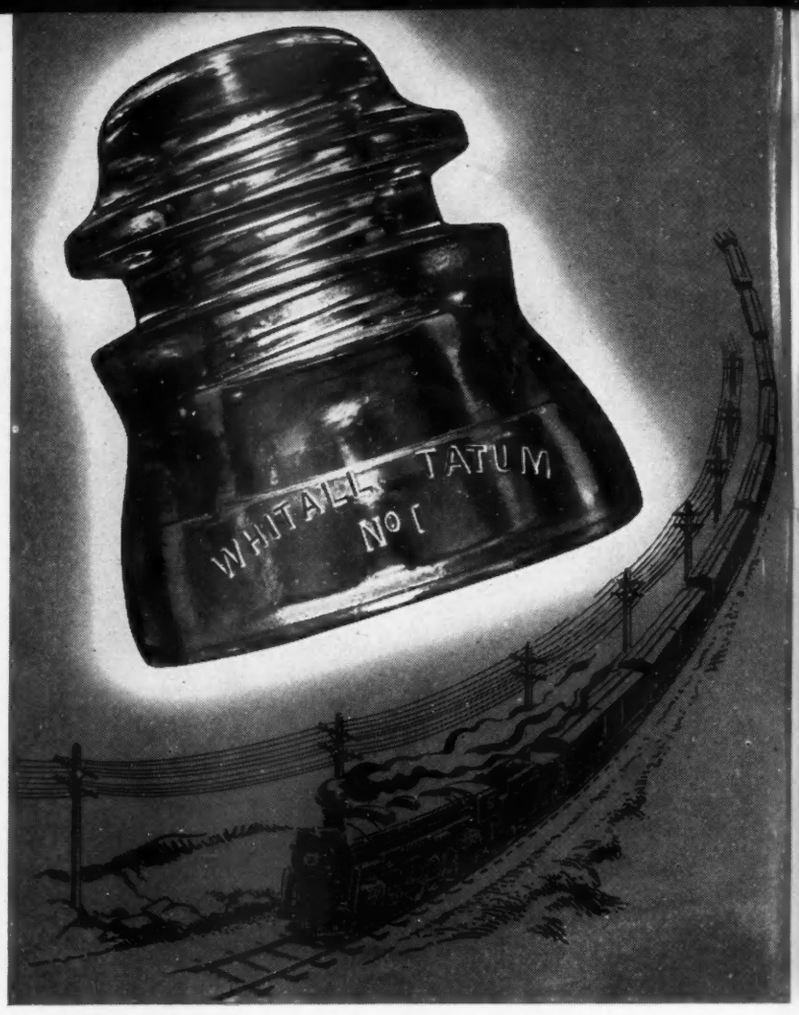
Quality in telephone construction conserves money, manpower and materials—a fact which is strikingly illustrated in the instance of insulated telephone wires. For years, telephone companies have depended on Acorn quality for the toughest insulated wire jobs. Today, for essential repair and maintenance, Acorn quality is virtually mandatory. For prices and delivery on Acorn products, address Leich Sales Corporation, 427 W. Randolph St., Chicago, Ill.

LEICH MANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 1907

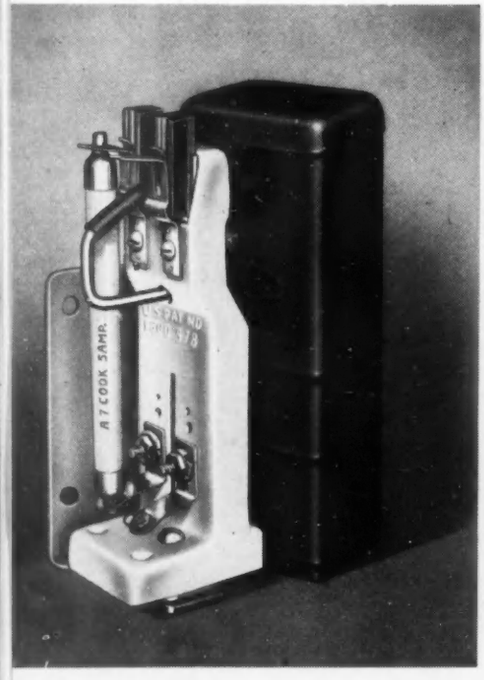


The Time-Tested Steel Strand. A heavy, ductile, tightly-adherent zinc coating, applied by the famous Crapo Galvanizing Process, provides lasting protection from corrosion in Indiana Crapo Steel Strand. Made by INDIANA STEEL & WIRE CO., its rugged strength minimizes maintenance.

Honorably Discharged. Although most Kellogg Signal Bronze Drop Wire with its armored insulation is still "in the army", some limited supplies will soon be available to telephone companies. It's strength, conductivity, and longevity make it the ideal drop wire under today's conditions.

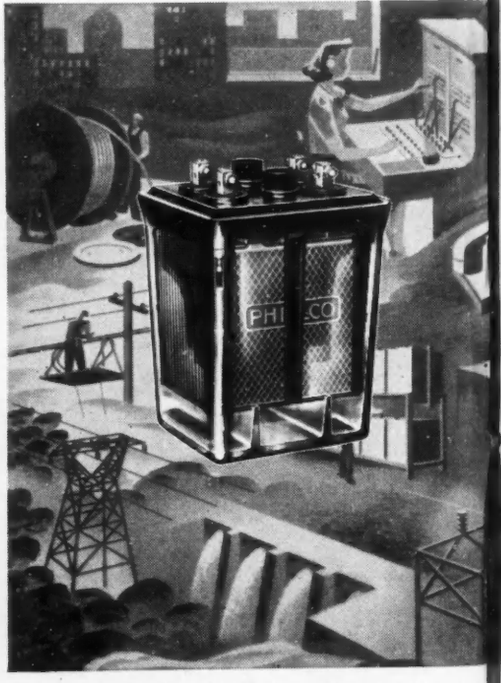


Meet Every Service Need. No matter what your requirement, there is a size and style of Armstrong's Whitall Tatum Insulator to meet it. Products of ARMSTRONG CORK COMPANY, these insulators feature crystal clarity of glass, accurate gaging, and unusual resistance to weather changes and extremes. They are a good bet for reducing your maintenance expenses.

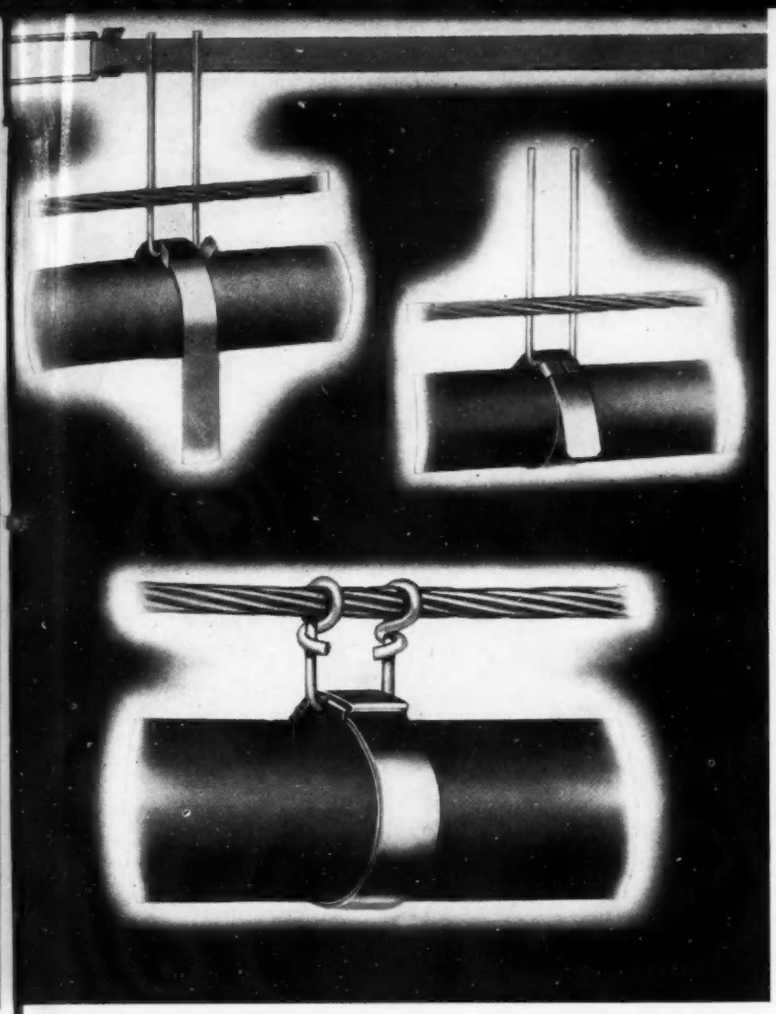


Built to "Take It!" The Cook Type "O" Sub-Station Protector, with one pair of fuses and one pair of high potential dischargers, is ideal for both indoor and outdoor use. Made by COOK ELECTRIC CO., its body is made of low-absorbent porcelain, to prevent surface leakage.

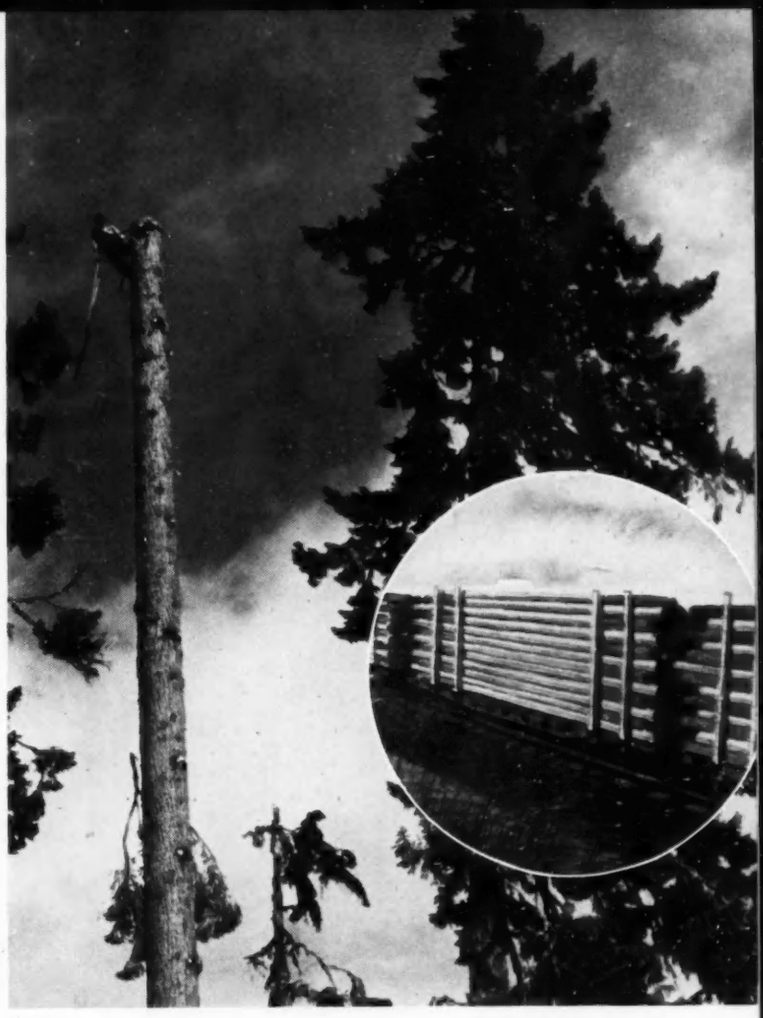
A Must Item in any service man's kit is a Vulcan Electric Soldering Iron. Made by VULCAN ELECTRIC CO., these irons assure a long life of unimpaired heat production. They come in 14 standard sizes of screw tip and plug tip types. Tips are hand forged of purest copper. Vulcan's soldering line is complete.



The Modern Engineering Features You Need for today's full float service are built into PHILCO Telephone Batteries. Both the design and metal used in Philco Floté grids represent a marked advancement resulting in higher electrical efficiency, elimination of low cells, and longer life.



Another Step in Your War on Wear. Adjust-A-Straps, used in the first two or three ring positions on either side of the pole, eliminate ring cutting in cable hanging. Too, these NATIONAL TELEPHONE SUPPLY COMPANY products permit a full hinge motion, thus allowing the necessary play as the cable vibrates, expands or contracts. This increases the life of the cable.



Topping a "Spar" Tree is one of the spectacular operations essential in logging the selected trees which become MACGILLIS & GIBBS CO.'s straight, sturdy Cedar Telephone Poles. Famous throughout the nation for their durability, strength and long life, these poles have been Kellogg recommended and supplied to telephone men for over 50 years. Make them your standard.

KELLOGG Recommends and Guarantees These Finer Supplies

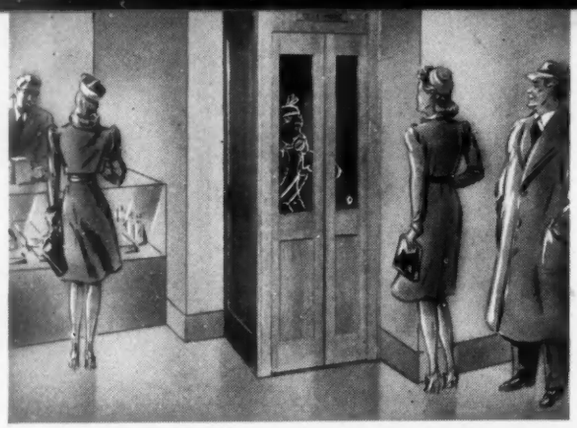
. . . and that is your assurance that the line supply and construction materials shown here—all products of leading manufacturers—can be relied on for dependable service and lasting satisfaction. Like all line supplies listed and described in the Kellogg catalog, they are backed by the famous Kellogg "double guarantee." This is your best assurance of getting materials that will perform properly over a long period of time. Send your orders to . . .

KELLOGG SWITCHBOARD & SUPPLY COMPANY

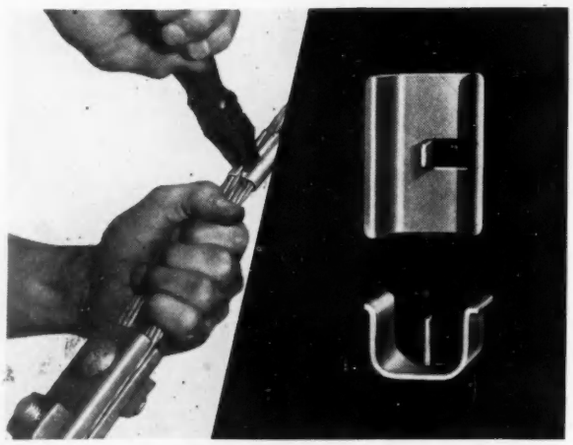
Factory and General Offices: 6650 South Cicero Avenue, Chicago 38, Illinois

Branch Offices: Kansas City San Francisco St. Paul Los Angeles

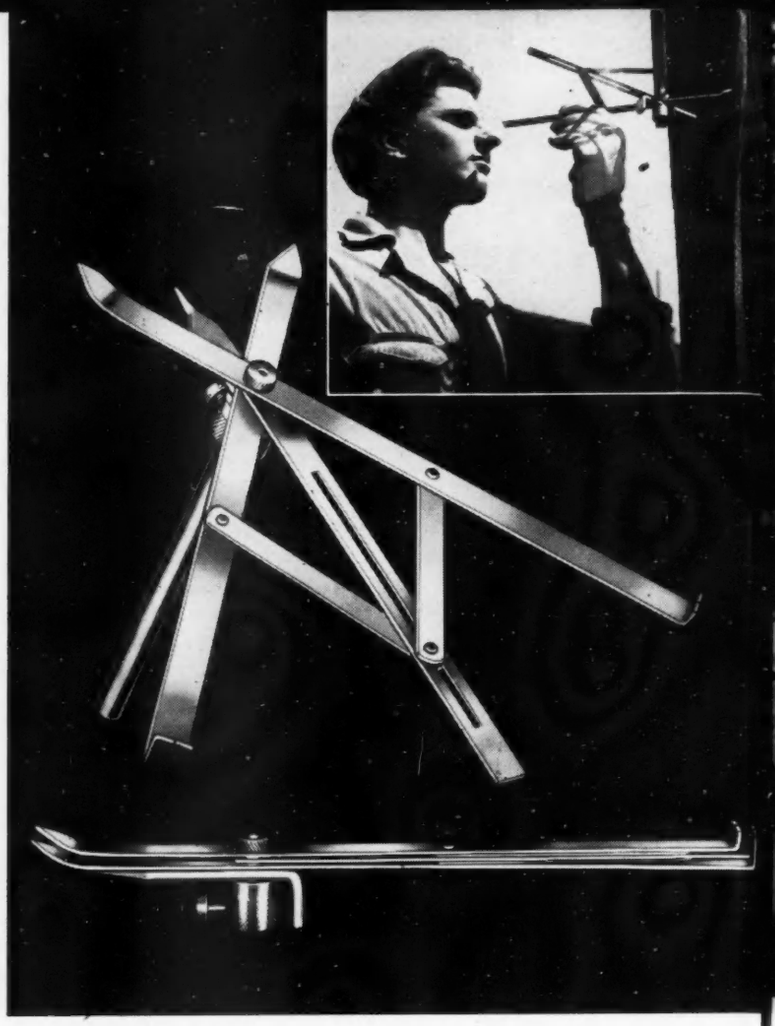
Order Your Line Supplies from KELLOGG



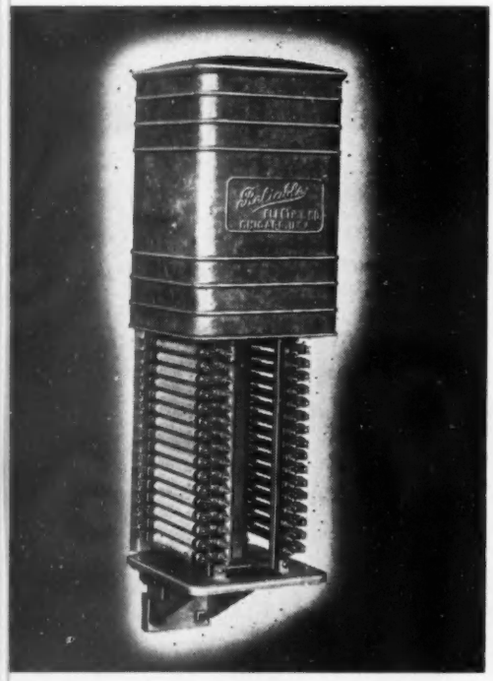
Increased Pay Station Revenue is easily accomplished when you give the public the privacy, roominess and comfort of CHURCHILL CABINET COMPANY'S Telephone Booths. Of the many styles available, the No. 100 Booth, with automatic light and automatic ventilator, is very popular.



Make Stronger Neater Installations. Money-saving Matthews Wire Clips have a patented locking tongue which prevents slipping and permits them to hold up to 150 lbs. pull. These W. N. MATTHEWS CORP. products are easy to install, save twisting of wires, and won't work loose.



It's a Matter of Seconds to locate the one correct position for pole anchors when you use the Dillon Bisector. Crewmen like the handy size of this instrument, its ruggedness, its downright accuracy. It's easy to use, has no complicated gadgets to adjust, and can be operated by anyone, regardless of experience. It's a product of W. C. DILLON AND COMPANY.



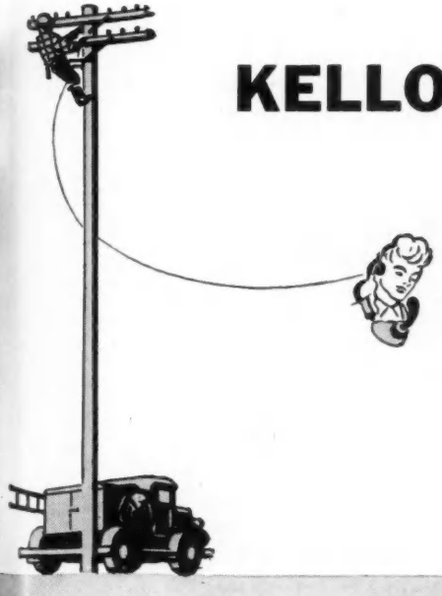
Linemen Know the Difference! All drop connections in the RELIABLE ELECTRIC CO. B27 Cable Terminal are made in front. Equipped with Sawtooth Discharge Blocks, it dispels static discharges without time lag or grounding of the line; lessens chance of high resistance ground.

Drier Than the Driest Desert! Drierite Desiccant is the safer way to dry out splices in lead covered cables. After splicing, sprinkle Drierite granules among the conductors. This W. A. HAMMOND DRIERITE CO. product absorbs all moisture, makes the splice about the driest part of the cable. Won't harm conductors.

No More High Resistance Joints and intermittent open-and-closed circuits, when you use KESTER SOLDER CO.'s Rosin-Core Solder! It seals joints permanently, protects them against service troubles. Used by Kellogg and many other leading manufacturers of communication equipment.

Shock-Absorbing "Spot-Light"! Flexibal is a *sensible* guy guard. Easily and quickly installed, it's aluminum coated, gives protection day and night. Made of short sections of wood, it absorbs impacts, preventing damage to itself or the striking object. Once installed, this S. E. OVERTON product stays on the job without requiring attention. Write today for descriptive bulletin.

You Can Reduce Replacements when you use "Eveready" "Columbia" "Gray Label" Telephone Cells, because they have long been famous for sustained voltage, extra hours of life, and uniform high quality. Products of the world's largest dry battery laboratory at NATIONAL CARBON COMPANY, INC., they are used exclusively by many Independent telephone companies.



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KELLOGG SWITCHBOARD & SUPPLY COMPANY

Factory and General Offices: 6650 South Cicero Avenue, Chicago 38, Illinois

Branch Offices: Kansas City San Francisco St. Paul Los Angeles

Order Your Line Supplies from KELLOGG

ROEBLING

BLUE RIBBON PERFORMERS every time—these five field-proven Roebling telephone wire products. And because you need tough, dependable performers for the telephone circuits you service, you can count on them as a sure thing to help you in your maintenance problems today. That's why, too, you'll want to specify them for your equipment tomorrow.

Our facilities—in manufacturing, engineering and research—are the result of more than a century's specialization in wire-making. Add to that our record of matching the exacting requirements of telephone companies . . . and you have the assurance of reliable wire and cable service.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

ROEBLING

PACEMAKER IN WIRE PRODUCTS

JAR ROEBLING

WIRE ROPE AND STRAND • FITTINGS • SLINGS
COLD ROLLED STRIP • HIGH AND LOW CARBON
ACID AND BASIC OPEN HEARTH STEELS • ROUND
AND SHAPED WIRE • SUSPENSION BRIDGES AND
CABLES • WIRE CLOTH AND NETTING • ELECTRICAL
WIRES AND CABLES • AERIAL WIRE ROPE SYSTEMS
AIRCORD, SWAGED TERMINALS AND ASSEMBLIES

"It Seems to Us"

Ralph Lucier, pres. and gen. mgr. of United Telephone Co., Inc., Warsaw, Ind., hit the headlines recently. His picture showing members of the Abilene, Kans., High School football team "way back when" shows him as a team-mate to General Ike Eisenhower.

•

Except being a swell fellow we haven't as yet found out just exactly what Herb Farr, sales manager of Plastic Wire & Cable, does during his off hours . . . or does he have any off-hours. We haven't found a time when he wasn't ready and willin' to talk plastic wire.

•

Major H. E. Billington, of the Signal Corp., and Air Corps, who is so well known to the telephone industry, is back in "civies." He has made no announcement of future plans as yet.

•

Roy Smith, TELEPHONE ENGINEER ad mgr., fancies himself an expert fisherman. Actually he is. But his effort to prove claims was most disastrous. Expressman who had to deliver shipment of decayed fish is still "gunning" for Roy.

•

G. A. Weatherly, manager of the Wingo (Kentucky) Telephone Company, is a man of many jobs. Besides maintaining the telephone plant and being part-time operator, he serves the town as marshal and tax collector, operates the water system, reads electric meters in two towns, collects for water and electric company, serves the F&AM lodge as secretary and also serves the county as notary public. At times he attends a picture show.

•

A very interesting story about a small town telephone operator and the part she played in the townspeople's lives appears in the July *Reader's Digest*.

•

Word from Kemp Haythorne of U. S. Rubber, N. Y., tells us that Col. L. D. Densmore of the Signal Corps has been home on leave after serving in the European theatre since the invasion of Africa.

TELEPHONE ENGINEER AND MANAGEMENT

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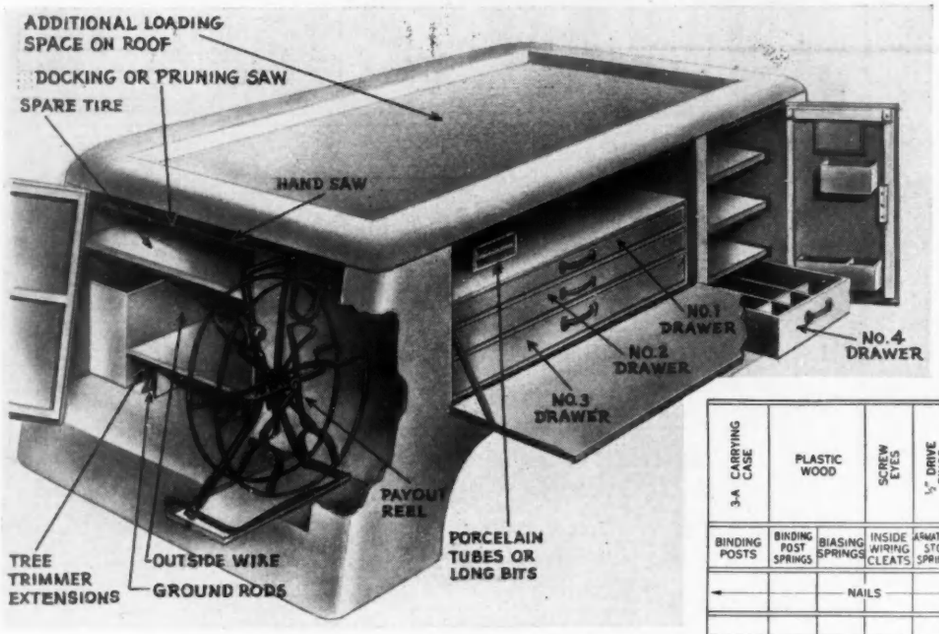
Founded in 1909

Office of Publication, Pontiac, Illinois. Executive and Editorial Offices 7720 Sheridan Road, Chicago 26 Illinois. Phone Rogers Park 3040. RAY W. SMITH, Editor: ROY F. SMITH, Adv. Manager, DON C. SORENSEN, Sales Prom. Mgr. Subscriptions: U. S., Cuba, Mexico $1.50 Per Year; Canada, $2.00; In all Other Countries, $3.50. Single copies, U.S.A., 15 cents. Single copy JANUARY 15 BLUE BOOK BUYER's GUIDE $1.00. All subscriptions should be sent DIRECT to 7720 Sheridan Rd. Chicago 26, Illinois.

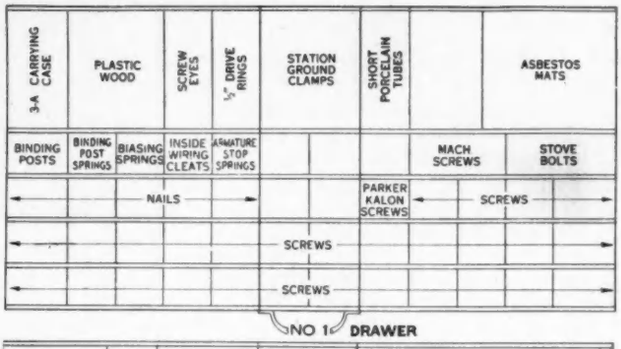
A PLACE FOR EVERYTHING . . . .

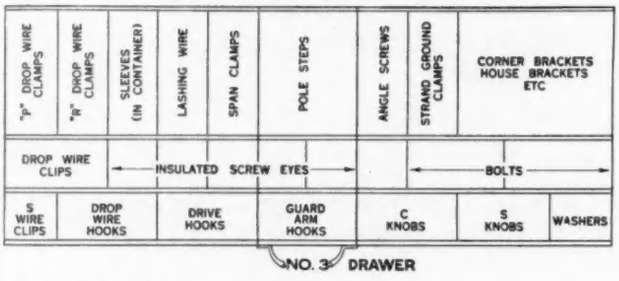
Carry Materials and Tools in Compartments Especially Designed for them!!

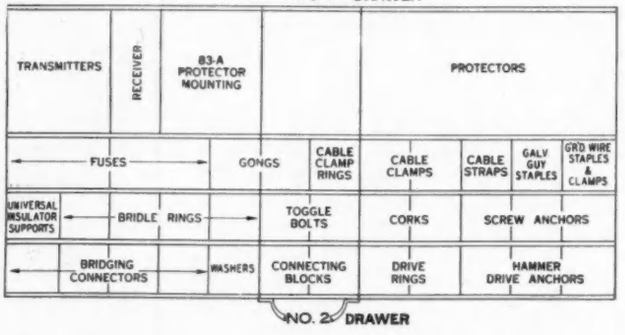


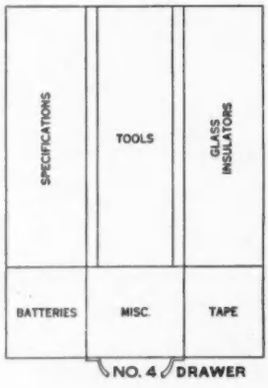
Compact Design of MODEL 2050 YORK-HOOVER BODY

Saves Time, Money and Increases Efficiency









York-Hoover Model—2050 Body, designed for installation on a standard ½ ton chassis, is definitely the solution to your light service and installation problem.

It eliminates, entirely, the possibility of not having the correct tools or materials for efficient service work, by providing a specific place for everything . . . which can be regularly checked each day in a very few minutes.

The drawers for small parts even have adjustable partitions for your further convenience.

In addition, the body itself is of all-metal construction, light in weight and built to give long years of trouble-free use.

Be "Body-Wise"! Write for additional data on Model—2050 . . . NOW!

YORK-HOOVER CORPORATION

BODY DIVISION **YORK, PENNSYLVANIA**

"I TIP MY HELMET"

To a girl, of course . . . a telephone operator in a central station back home. It was "just a note of thanks to Operator 308, for her sincere efforts in trying to locate my wife . . . something to make a soldier's heart beat a little stronger and give him courage to fight for his country the harder . . . I tip my helmet to a really sweet person."

Day after day the letters come, uncounted numbers of them, from the boys in the service, from mothers, wives and sweethearts, saying "thanks" for special services cheerfully performed by workers in every department. They pay a well-merited tribute to the telephone tradition of faithfulness and dependability.

In Exide Batteries you will find the same dependability for which telephone service is famous throughout the world. Since 1895, Exides have been proving themselves worthy of that trust.

ARMY E NAVY

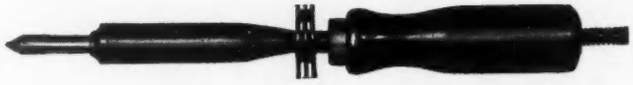
Exide
TELEPHONE BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

DRAKE — A NAME TO REMEMBER for RELIABLE SOLDERING EQUIPMENT

Through 25 years of soldering iron manufacturing, Drake has developed soldering products that set new high standards of quality and long-lived performance.

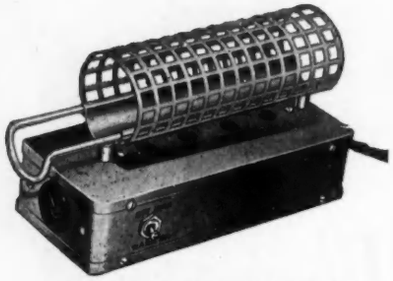
DRAKE No. 400, for example, is ideal for work in small places—weighs only 8 ounces and is only 9 inches long, yet it is a 60-watt iron.



DRAKE No. 600-10, is conservatively rated at 100 watts, but is only 10 inches long.

DRAKE SOLDER POTS

are available in 150 and 300 watt ratings to meet varying needs.



DRAKE HEAT CONTROL

is a fool-proof device for keeping idling irons ready for quick use.

*GraybaR QUALITY SINCE 1869 * REG. U.S. PAT. OFF. — Distributed by *GraybaR ELECTRIC COMPANY

Immediate shipment from stock on moderate quantities with priority rating of AA-5.

DRAKE ELECTRIC WORKS, INC.
3656 LINCOLN AVE. CHICAGO 13, ILL.

- YES - We Can and Will Help You with Engineering Management or Construction Problems!

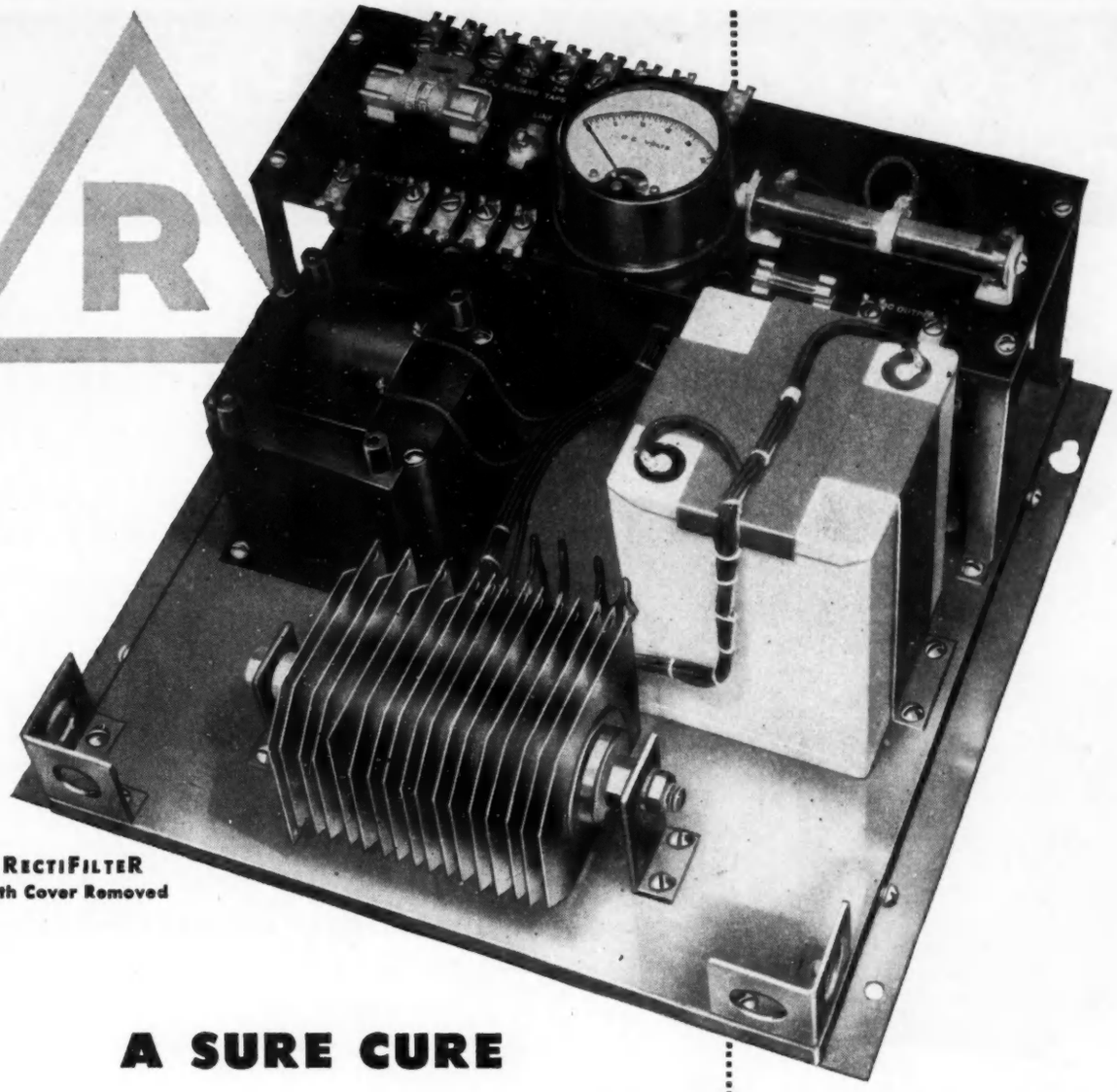
if YOU want us to—

GUSTAV HIRSCH ORGANIZATION

310 West Broad St., Columbus 8, Ohio

MAIN 6533

Nationally and Internationally known, In the field of Light, Radio or Telephone!



RECTIFILTER
with Cover Removed

A SURE CURE

FOR POWER SUPPLY PROBLEMS

in PBX and PAX Service...

RAYTHEON RectiFilteRs

Raytheon RectiFilteRs, battery eliminators, will solve your power supply headaches by providing stabilized D.C. current directly from A.C. lines. They are efficient, compact and require no adjustments. Simply plug them in and they'll take care of themselves. No moving parts mean no wearing parts, assuring long life. Write for Bulletin.

RECTIFILTERS

- Eliminate batteries and the expense of routine service.
- Release charging cable pairs, at remote locations, for revenue producing service.
- Provide stabilized D.C. output voltage from no load to full load.
- Minimize power costs because of high efficiency in converting A.C. to D.C.
- Save $30 to $90 a year.
- Wide range of models for varied operations . . . 50 to 60 cycles.

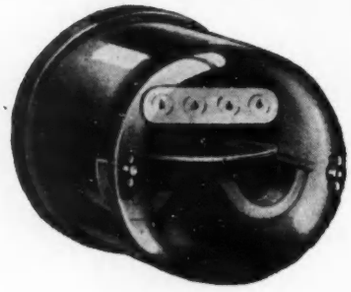
Tune in the Raytheon radio program: "MEET YOUR NAVY," every Saturday night on the Blue Network. Consult your local newspaper for time and station

RAYTHEON
MANUFACTURING COMPANY
Electrical Equipment Division
190 WILLOW STREET, WALTHAM, MASS.

The coveted Army-Navy "E", for Excellence in the manufacture of war equipment and tubes, flies over all four Raytheon Plants where over 16,000 men and women are producing for VICTORY.

Devoted to research and manufacture of complete electronic equipment; receiving, transmitting and hearing aid tubes; transformers; and voltage stabilizers.

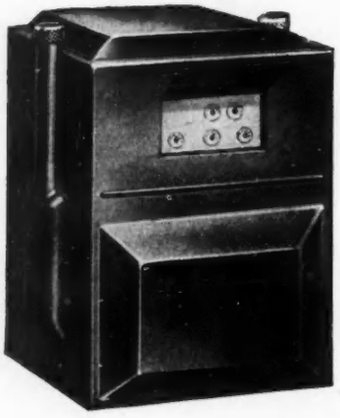
CALCULAGRAPH
DOES FOR LONG DISTANCE CALLS –



What METERS do for the GAS AND ELECTRIC UTILITIES

•

This METER measures kilowatt hours of electricity used



•

This METER measures cubic feet of gas consumed

•

MODEL 33

THE CALCULAGRAPH METERS the elapsed time of toll calls

The CALCULAGRAPH serves the telephone industry by printing accurate records of toll calls as a basis for billing. These records show starting time and the chargeable elapsed time to the second on each toll ticket.

Reliability and simplicity of operation have made the Calculagraph standard equipment for telephone companies throughout the world.

CALCULAGRAPH COMPANY

Incorporated 1892

310 SUSSEX STREET • HARRISON, N. J.

Fireworks ON WHEELS

Marine fireworks on bloody Iwo Jima, as pyramids of projectiles rain death on Japanese emplacements. Rocket launchers are mounted on International four-wheel-drive trucks. —Official U. S. Marine Corps Photo by S/Sgt. Rex M. Robbins.

AMERICA bounced back hard in this war against the Japs, and the boys who led the rebound were *United States Marines.*

From Guadalcanal to Okinawa the Marines have proved that boys from Kokomo, the Ozarks and the Bronx—when steeped in Marine Tradition, skilled with Marine training—are doggone good fighters. On beachhead after beachhead—then in jungle after jungle—they were far outnumbered by the Japs. But not outfought!

On they go, those Marines, on land and sea and in the air . . . outsmarting, outshooting, outkilling the enemy . . . till the Japs say "Uncle."

They have good equipment, sure. Most of the thousands of trucks they use, for example, are International four and six-wheel-drive military type vehicles built especially for the Marine Corps.

But proud as we are that Harvester has been able to make equipment rugged enough to fight with the Marines, we know that the real fighting machine in this march to Tokyo is the Marine himself. What a machine! All speeds forward . . . none reverse. Tough . . . rugged . . . smart. A superlative fighter. A superb citizen.

We proudly salute the boys from Kokomo, the Ozarks and the Bronx, who are *fighting* up to their glorious motto—Semper Fidelis.

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Patents Pending

As every lineman knows, there have been two ways to make dead ends on multiple-wire zinc-coated strand on telephone and power lines.

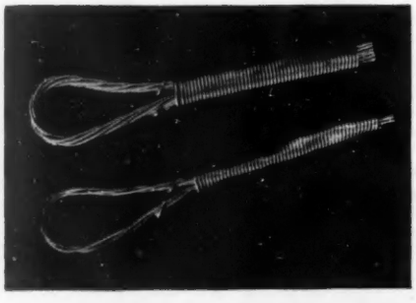
One method is the familiar "breakdown serve,"—a laborious job which, when made with pliers, tends to invite corrosion by damaging the zinc coating of the wires. The other and now most common way is the use of clamps.

Now Bethlehem's research engineers have developed a handy serving tool which provides a quick, economical technique for making serves, on bethanized strand or Ruralductor. With the tool, which is a simple, one-piece winding appliance, any lineman can quickly master the technique —called the "dead-end coil" method because it uses a 10-ft. coil of dead-end wire to make the serve.

The new-type serve is a strong, tight wrapping of 11-gauge bethanized wire, given fifty turns around the dead end. The wire is easily applied: the lineman simply engages it between the two "fingers" projecting from the tool, which hold it under steady tension while the tool is rotated.

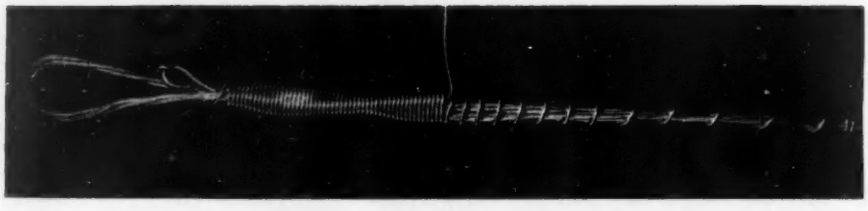
The ductile, tight zinc coating of bethanized wire or strand is not displaced to any harmful extent by the smooth, hard "fingers"—and tests show that the serve holds beyond the useful strength of the strand. However, the technique is recommended for use only on bethanized strand, as the holding power of the dead end is not always as reliable with other types of coatings.

For your next installation, give some thought to the advantages of bethanized strand, plus the Bethlehem serving tool. For complete information, get in touch with the nearest Bethlehem representative, or write direct to Bethlehem Steel Company, Bethlehem, Pa.



SERVES ON 3- AND 7-WIRE STRAND—These dead ends were quickly made with the new Bethlehem serving tool. The wire used is 11-gauge bethanized. The tool is suitable for the commonly used sizes and grades of strand, in class A, B and C coatings.

VIBRATION-DAMPENING ASSEMBLY—For this vibration-dampening dead-end assembly on three-wire Ruralductor, jumper wire of soft steel is laid in the valley between strands, and fifty turns of dead-end bethanized wire applied with the tool. The jumper wire is thus firmly secured, without interfering with the holding power of the dead end, and with good electrical contact. The individual strand wires are fanned back below the serve, and cut to lengths of 1 in., 5 in., and 10 in., respectively. The remaining dead-end wire is wrapped by hand. This provides an effective vibration-dampener.



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As our Pacific offensive drives closer and closer to Tokyo, more and more communications equipment will be needed to complete our circuits for Victory. For Western Electric—as for our fighting men—there is still a big job ahead.

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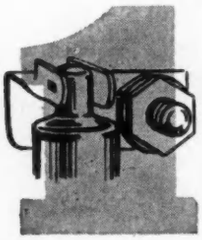
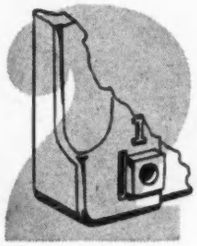
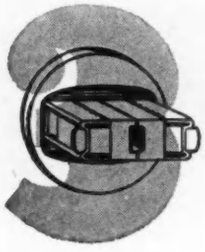


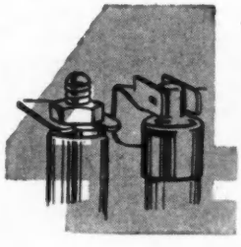
All fuse clips and discharge block springs are heavy phosphor bronze. Binding posts are treated to prevent season cracking and are equipped with beveled washers.



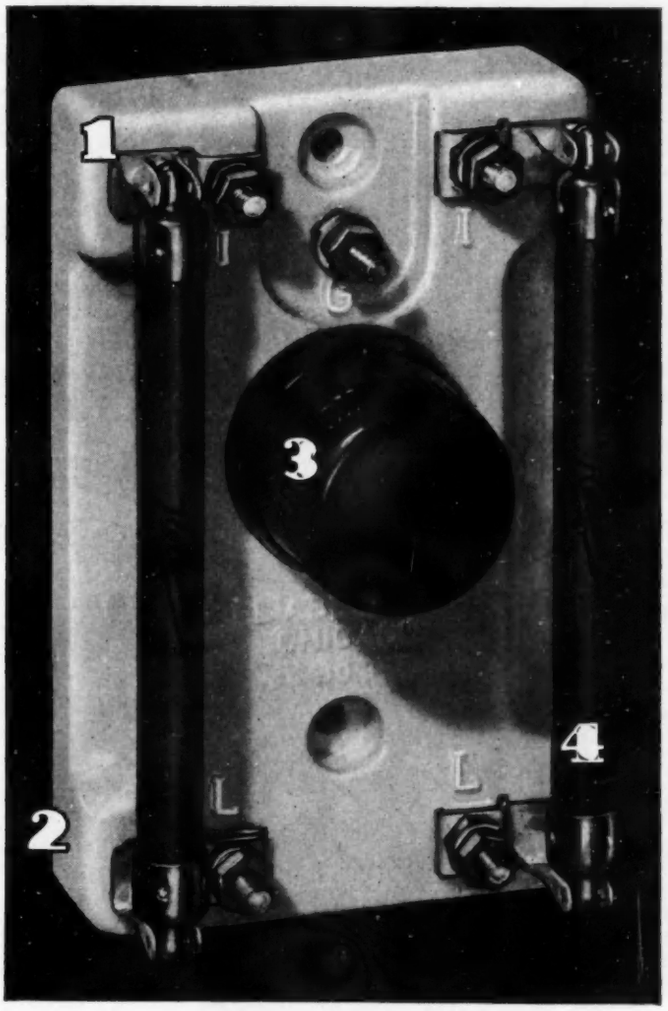
Special low absorption porcelain is used for the base. The one-piece design of the base is a decided advantage in mounting, eliminating the need for asbestos mats.



The famous Reliable Self-cleaning Sawtooth Discharge Block is standard equipment. Static discharges or surges are instantly drained without leaving the line grounded.



No. 955 is equipped with No. 55 fuses. No. 955A is equipped with No. 77 fuses. Seven ampere fuses are standard—other capacities supplied when specified.



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The MILLIONTH Mile of Field Wire

More than twenty months of inspired war effort on the part of the Men and Women Employees of the St. Louis Plant of General Cable Corporation were crowned today with gratifying success when the millionth mile of critical field communication wire, single conductor, rolled off the production line ready for shipment to our armed forces overseas.

This notable General Cable achievement, one of the most significant accomplishments in the production of a vital war material to be achieved in the St. Louis area and unequalled in performance in any communication wire plant in the world, marks an epochal milepost in the production of field wire which began in the local plant in October, 1943.

More than four thousand employees working on an average of fifty-two hours per week in three shifts, seven days, are engaged in meeting the urgent requirements for field wire of the United States and its allies. Current production is running in excess of four thousand miles per day or, putting it another way, approximately five times around the globe once a month.

In commenting on the production feat of the local organization, Mr. Dwight R. G. Palmer, President of General Cable Corporation stated, 'Though the performance of our St. Louis Plant was accomplished in the ordinary line of duty, Management nevertheless is particularly gratified that its personnel, comprising all races, creeds and colors, harmoniously evidenced their patriotic sincerity by establishing this outstanding record. We salute the Men and Women of our St. Louis Plant for this production achievement'.

OF FIELD WIRE...

Just one example of General Cable's Service to the Nation and its Allies

This output of *one million miles of single conductor communication wire* for the armed services represents the *all-out* effort at only one plant producing enough wire to encircle the globe five times each month.

All ten General Cable plants have been working three shifts, seven days per week, on this and other essential military items.

Come final Victory, General Cable will as energetically attempt to do its part in winning the peace.

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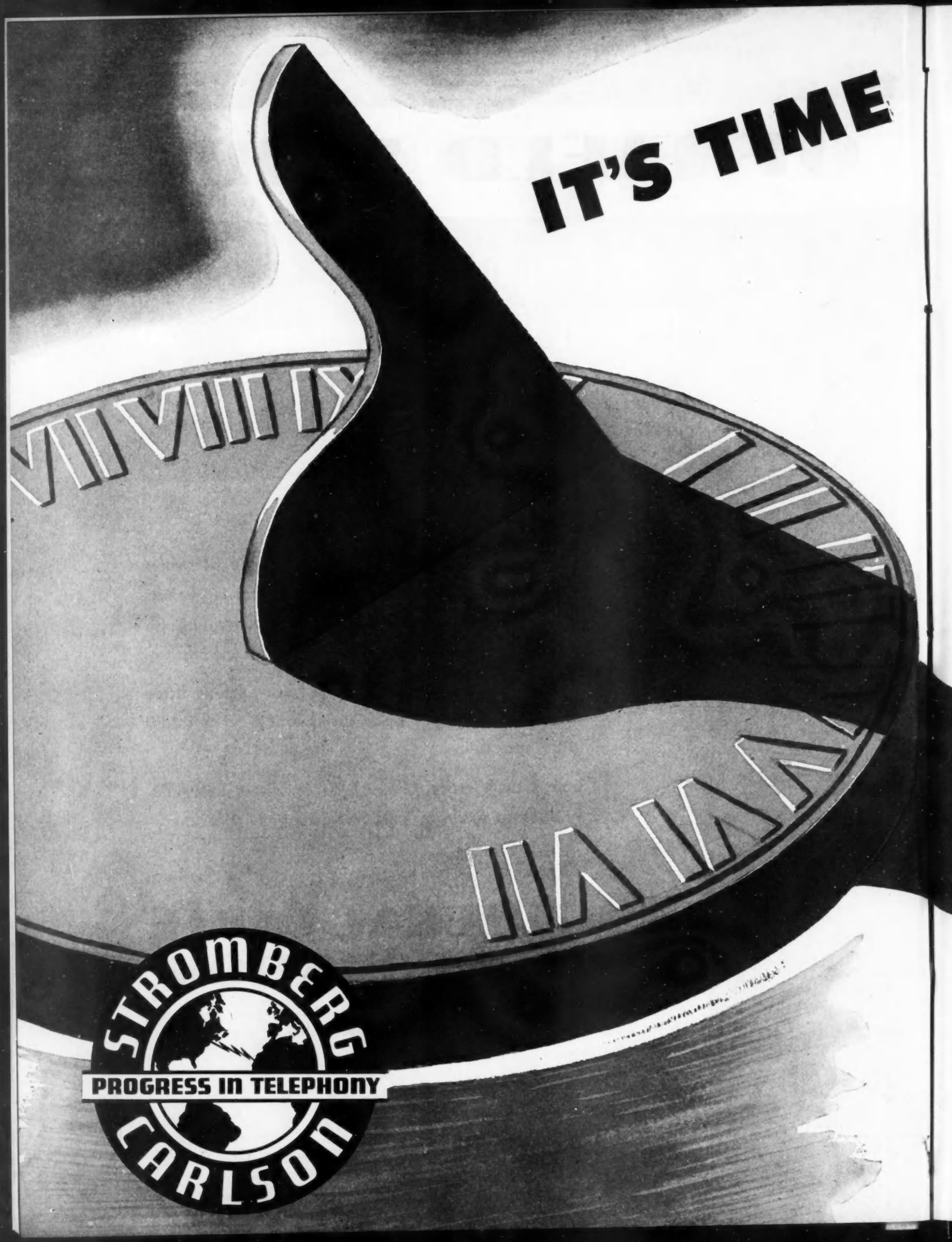
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PROGRESS IN TELEPHONY

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Many new features exclusive to Stromberg-Carlson are built into this equipment—features that will give your subscribers better service and permit you to enjoy lower maintenance costs.

Discuss your dial needs with a Stromberg-Carlson representative. Let him outline what Stromberg-Carlson has for you in dial. You will agree with other operating companies, which have investigated, that "In Dial, There is *Nothing Finer* than a Stromberg-Carlson."

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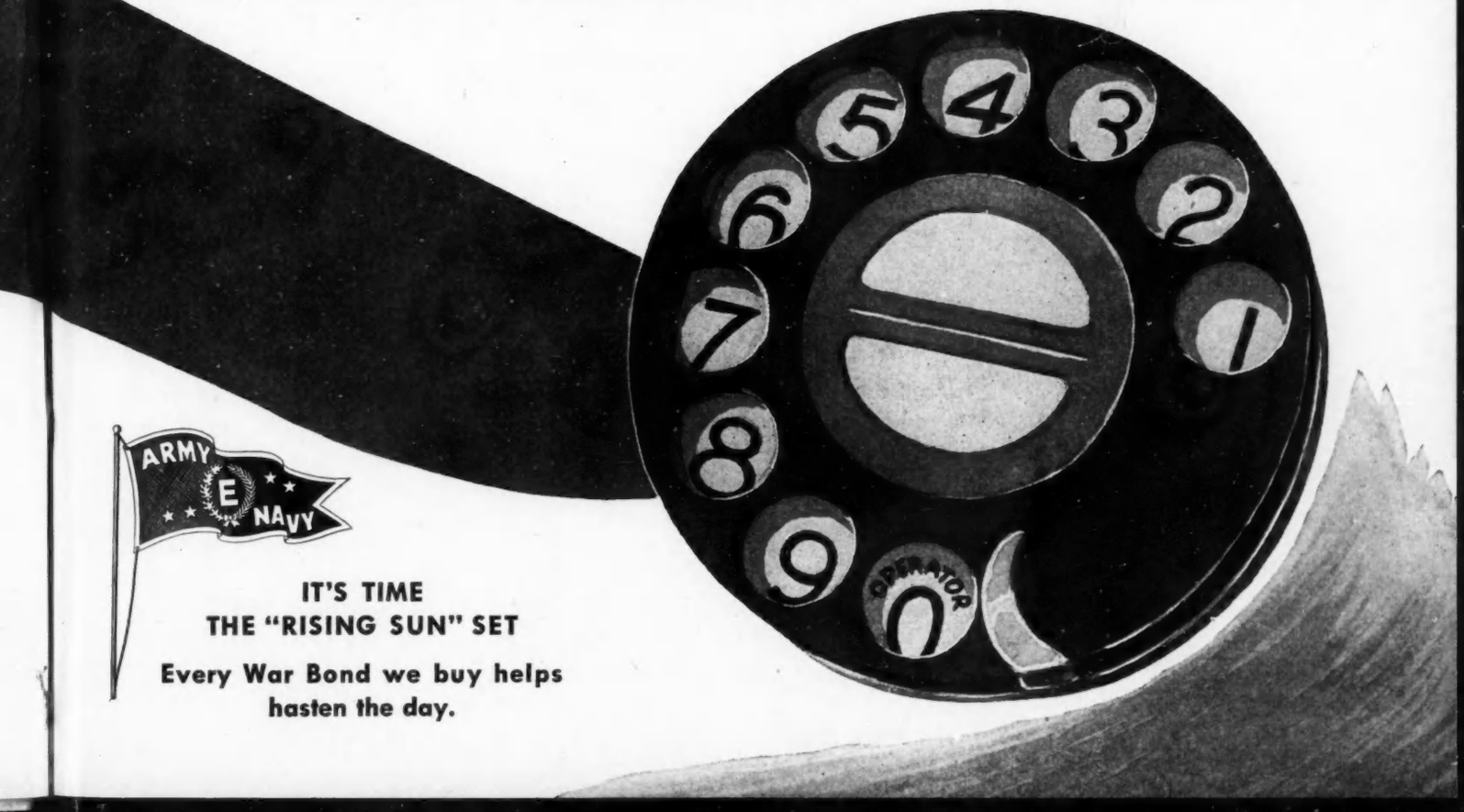


IT'S TIME
THE "RISING SUN" SET

Every War Bond we buy helps hasten the day.

EDITORIAL

In Time of War

THERE is nothing unpatriotic in planning and even preparing now for the peacetime that we know is coming. On the contrary, there will be less upset in this country, in the transition from war to peace, if the business of the country is prepared as fully as it can be for the change.

The change could come suddenly. It may be 90% wishful thinking to believe with some high-ups who have been quoted that the war with Japan will end this year. But there is nevertheless a possibility—even if not a probability—that that can happen. And, if it does, it will no doubt happen suddenly.

The sudden end of this war—no matter when it comes—would throw a lot of business and other things into an upheaval unless we are well prepared against such a contingency.

The telephone business, as much as any business in this country, is a good barometer of the country's activity. It went down with the Great Depression, and now, even after discouraging as much as it properly could the use of its facilities, it has in the neighborhood of 2,000,000 applicants for its exchange services.

The telephone man, as much as any other business man in the country, must be a good guesser as to the direction in which the cat will jump in the future. He must be a better guesser than many business men, because the telephone company cannot prepare overnight to meet future conditions. It takes time to make additions to central office equipment and to get and hang cables and to build telephone lines.

It is one of the penalties for being an essential industry that the managements in industries must always be alert to coming changes in conditions. The applicant for a telephone will—as he usually has—take the delay in installing his telephone somewhat philosophically when there is a war on, but he is not likely to be so philosophical about it in peacetime.

The burden of our song is, therefore, that the telephone industry, as much as any other industry and to a greater extent than many, must be prepared for peace.

ALREADY changes are taking place which will have their repercussions on the postwar telephone business. An interim tax bill is now going through Congress. Some cutbacks for war supplies are changing the production activities of manufacturers of telephone apparatus and supplies. The movement of people from war plant areas to other places—frequently back to the old home town—is getting under way. There is talk about the lessening of restrictions on home building. And so on.

Every one of these things, and other things besides, has an effect upon the future telephone situation.

The telephone industry met the war situation nobly—now it is up to us to meet the peace situation with the same efficiency.

We think the management of every Independent telephone company should figure out and write down, right now, its answers to the questions: "What do we need to do and what must we prepare to do when peace comes?" We think that the managements who answer those questions most satisfactorily will be those who will have the least trouble in the transition from war to peace.

We have been "beating the drum" on this question of postwar preparation for many months. Some may think that we have overdone it. We doubt if it can be overdone.

We think the best advice that can be given to any Independent telephone company now is: "In time of War, Prepare for Peace."

The Rural Line NOISE Problem

By George W. Peterson

NOISE levels are higher today on rural subscribers' lines in my opinion than at any time in the past. Part of this increase in induced power noise has resulted from manpower shortages and the resultant deferred maintenance. Higher noise levels are to be expected because of the extensive rural power line networks which have been constructed during recent years. However it is easily feasible to keep power noise on rural subscriber lines to a fairly low level provided both power and telephone companies cooperate in keeping the inductive influence of the power lines and the inductive susceptiveness of the telephone lines at a minimum value. The inductive interference problem will continue to be more pressing as time goes on. The continued expansion of rural power networks, the greater power load carried by these networks, and the more extensive use of motor driven machinery on farms will all tend to increase the inductive influence of rural power systems.

The correction of inductive interference does not lend itself to hit and miss methods. It is necessary that an overall effective treatment be applied to the affected telephone network to produce worth-while results. Due to its very nature inductive noise is more difficult for the average small telephone company to locate and correct than are most other types of trouble which affect the service of a telephone circuit.

Principal Features of Problem

WITH respect to inductive interference rural lines may be considered as falling into two groups, viz: (1)—grounded type rural lines, (2)—metallic lines. Little can be said that will be helpful in reducing noise on telephone lines of the grounded type. It is virtually impracticable to give good commercial telephone service over grounded type telephone lines if the lines are involved in rural power line parallels which are much in excess of ½ to ¾ of a mile.

Now that funds are again being allocated for R.E.A. rural power line construction in new areas many telephone companies will be faced with the noise problem. My observation has been that many small telephone companies wait until a rural power network is completed and energized before taking the necessary steps to metalize grounded rural lines. While

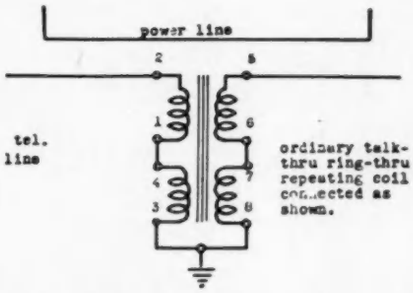


Fig. 1—Connections of a repeating coil used as a transposition.

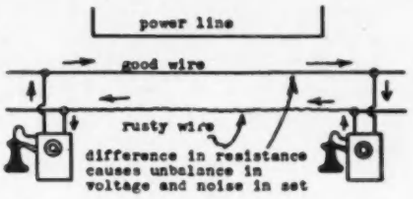


Fig. 2—Effect of one rusty wire on metallic circuit noise.

this method has the definite advantage of giving rural subscribers a demonstration of why extensive rural line rearrangement and wire additions are necessary, the method has the distinct disadvantage of interfering with the furnishing of good continuous telephone service and is not recommended.

It is natural that operating companies facing extensive parallels of their grounded telephone lines for the first time are hopeful that the noise situation will not prove sufficiently bad as to require the large substantial expenditure usually involved in converting to a two wire basis. While "hope springs eternal," it is too much to expect that by some miracle the grounded telephone lines in a particular community may not require metalization even though heavily involved in parallels with new power networks.

Make Your Plans Promptly

WHEN it is definitely established that a power network is to be built in a given area, consideration should immediately be given to conversion from a grounded to a metallic basis. In most cases this will necessitate a survey, the planning of the work required, obtaining the material, and the actual construction and cut over to the metallic basis. All of this takes time and should be started early if serious impairment to telephone service is to be avoided. If an increase in rates is necessary, as it usually will be, familiarize your regulatory commission with your problems and it is doubtful that any real difficulty will be encountered in this direction. Your rural subscribers should of course be adequately informed as to the reasons for the change and the increased rates.

Remedial Measures For Grounded Lines

I HAVE been asked many times if there isn't some alternative to metalization of grounded rural lines which become involved in power parallels. I believe there is no method whereby grounded lines can be continued in service if they are heavily involved

in power parallels. It is true that repeating coils placed at intervals (Fig. 1) in a grounded telephone line and properly phased can in effect act like a transposition and thereby partially equalize the induced power voltage. For various reasons, many of which will be obvious to telephone men, this scheme is not feasible for general application although it can in some isolated cases be used as a specific remedy.

(a)-Electromagnetic Induction. (b)-Electrostatic Induction.

Fig. 3—Noise is due to electromagnetic and electrostatic fields around power wires.

Publicity recently given the "phase inverter" transformer as a means of relieving interference in specific cases has caused some telephone men to believe that this device, which is applied to a power line by the power company, might solve all of their inductive problems. This optimism is not justified by the facts. The phase inverter does have some occasional use for treating a specific isolated case, but it certainly is not suited for general application to a rural power network.

Fig. 4—Three mile section of four wire line showing location of transpositions needed to minimize noise and crosstalk.

It, in effect, is merely a transformer which is placed in the power line at some point in the parallel and by proper "poling" it produces a partially neutralizing effect of the induction in paralleling telephone lines.

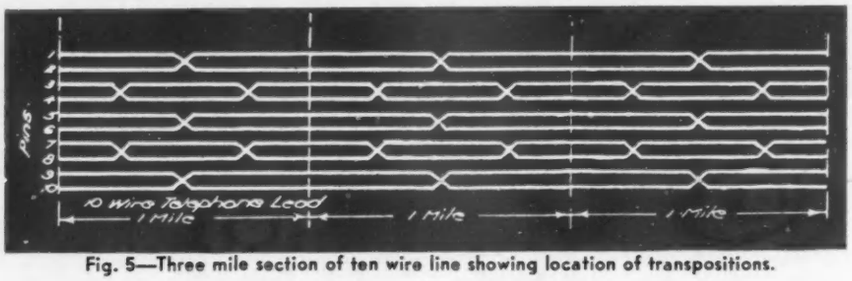


Fig. 5—Three mile section of ten wire line showing location of transpositions.

This system is particularly effective on a power line which is largely unbalanced in character, however, the cost of the transformers and accompanying lightning protection limits this method to situations in which a single transformer might produce a beneficial effect in a long parallel.

Metallic Lines Not Complete Answer

THE replacement of grounded type telephone lines with metallic lines reduces noise levels substantially. Some companies conclude that it is only necessary to change from a grounded to a metallic basis to completely eliminate the noise problem. Nothing could be further from the truth. Unless the metallic line is well balanced electrically with respect to the paralleling power line, noise levels may be objectionably high.

The prevailing practice of merely adding one new wire to each existing ground line regardless of its condition as shown in Fig. 2 has been a source of headaches to some companies. As is later discussed in detail, the metallic line must be well balanced electrically if it is to be effective in keeping noise at a minimum.

Well constructed and maintained metallic lines free from tree interference not only have low noise levels but they also lend themselves to ready conversion to dial operation when the time comes. This is a good point to remember when considering the advantages of conversion to a grounded basis.

Reasons for Noise

IN this article, we are not so much concerned with what causes noise but rather what we can do to keep it at a minimum level. Some general statements regarding basic noise principles may be of interest to those considering the noise problem for the first time. Noise is due to the electrostatic and electromagnetic fields which surround power lines as shown in Fig. 3. These fields induce voltages which set up circulating noise current in paralleling telephone lines. The extent of these inductive effects depends on the magnitude of the voltages and currents on the power line; the harmonic frequency composition of the interferring currents and voltages; the spacing between power and telephone line, and the length of parallel. As previously stated, it is the obligation of the power company to keep the inductive influence of its system low so that for a given degree of coupling the resulting noise will be at a minimum.

It is likewise the obligation of the telephone company to so construct its lines that the power voltages which are induced in the telephone wires and between the telephone wires at ground will be ineffective in setting up circu-

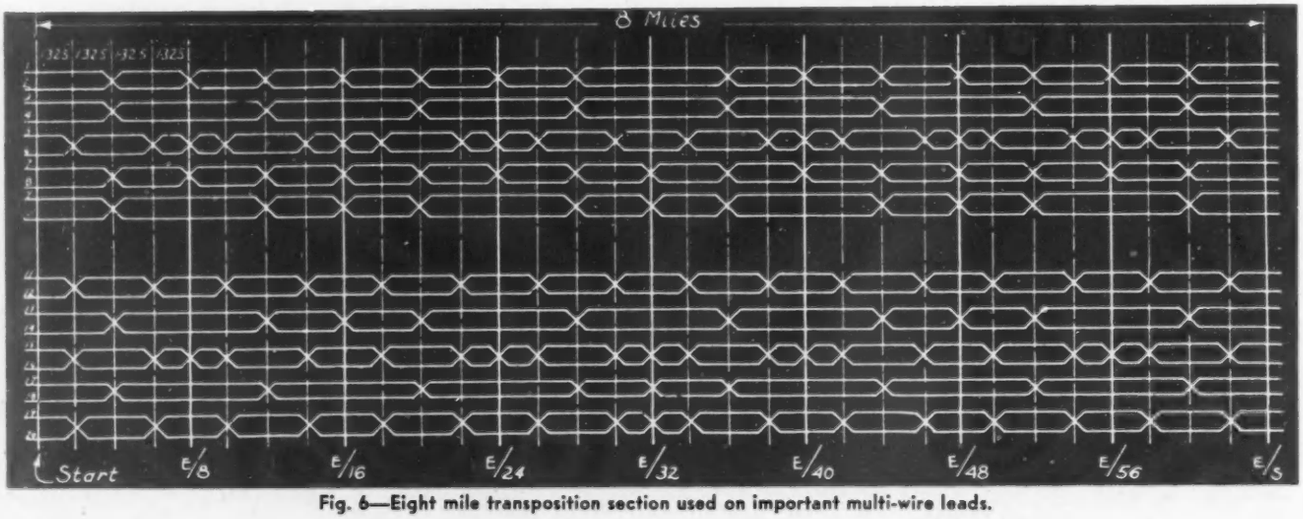


Fig. 6—Eight mile transposition section used on important multi-wire leads.

lating noise currents with consequent transmission impairment.

Inductive Susceptiveness of Power Systems

THE inductive influence of a power system is controlled by a large number of factors including the type of line, the voltage, power carried, transformer and generator design, method of operating the connected equipment, etc. It has been rather well established that the inductive influence of the type of rural power lines now being built is relatively high, however, for reasons of line construction economy and certain operating advantages this type of line is generally considered as the best for the purpose for which it is used. Little can be done in the way of lowering the inductive influence on the lines as now constructed. The power equipment units now being built are so designed as to minimize harmonic frequencies.

The principal way in which a power company can coordinate its effort with that of the telephone company is to keep the inductive influence of its lines as low as possible. This means the prompt replacement of faulty insulators or lightning arrestors, prevention of transformer overloads and the prompt elimination of any connected equipment which through faulty design or maintenance may be a source of abnormal interference. Telephone companies should keep in close touch with the power company and make sure that it understands that the problem of keeping inductive noise on telephone lines at a low and satisfactory value is a joint undertaking.

Factors That Affect the Inductive Susceptiveness of Telephone Circuits

RURAL subscriber metallic lines can be operated at low noise levels if attention is paid to the following factors which influence the inductive susceptiveness of such lines, viz:

(1)—Improper or inadequate transpositions.

(2)—Faulty insulation permitting induced power current to flow to ground.

(3)—Series resistance unbalances in the two wires.

(4)—Longitudinal power current flow due to unbalances in central office equipment.

(5)—The use of low impedance ringers in grounded signalling systems.

Transposition Schemes

WITH the type of rural power line generally employed little help can be obtained by the use of power line transpositions. Telephone transpositions, however, are necessary and very effective in holding noise to low values. The system of transpositions employed need not be complicated. If only a single two wire circuit is involved, an excellent balance is obtained if the line is transposed at the quarter and ¾ points in each mile.

If two circuits are involved, transpositions placed at the ¼ and ¾ mile points in one of the circuits and at the half mile point in the other (Fig. 4) will produce a fair balance to paralleling power circuits and will also be well balanced from a telephone crosstalk standpoint.

Where a greater number of circuits are involved on a rural lead, the simplified transposition scheme shown in Fig. 5 can be used.

The larger companies use more elaborate schemes, such as that shown in Fig. 6, when a substantial number of wires are involved and when excellent crosstalk and noise balance is desired over long sections. Either scheme may be used with effective results on rural lines.

Action of Transpositions

THE purpose of a telephone transposition is to equalize the power voltages induced on the two sides of the telephone circuit.

The power voltages induced in the telephone wires may be quite high but as long as they are kept balanced the noise currents which circulate through the connected subscribers' sets will be low.

If phantom telephone circuits are involved, it is necessary to interchange the pin position of the two pairs of the phantom circuit in order to effect the transposition. Any one of four different types of phantom transpositions can be used for this purpose. Most of the standard transposition schemes are so arranged that phantom transpositions not only transposes the phantom circuits to outside exposures but also produces certain other transposition effects within the group. Fig 7 illustrates the two types of transpositions.

Space does not permit a lengthy discussion of the theory and application of the various types of phantom transpositions used in standard schemes. It is sufficient to say that a type one transposition, which involves both an interchange of the side circuits and a transposition of each side circuit, transposes both the phantom and the side circuit to outside exposures. If group crosstalk considerations are not taken into account and it is simply desired to transpose a phantom to outside exposures, type one transpositions inserted at the quarter and three-quarter mile points should prove effective.

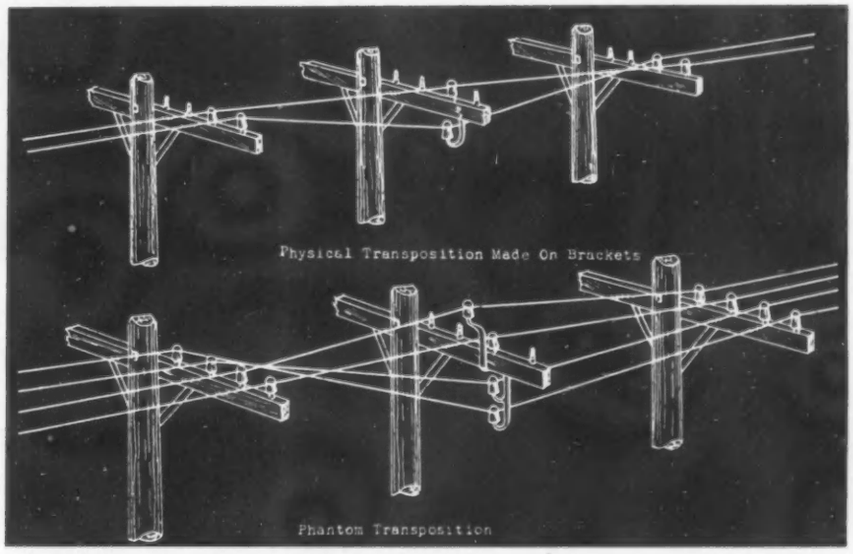


Fig. 7—Two types of transpositions.

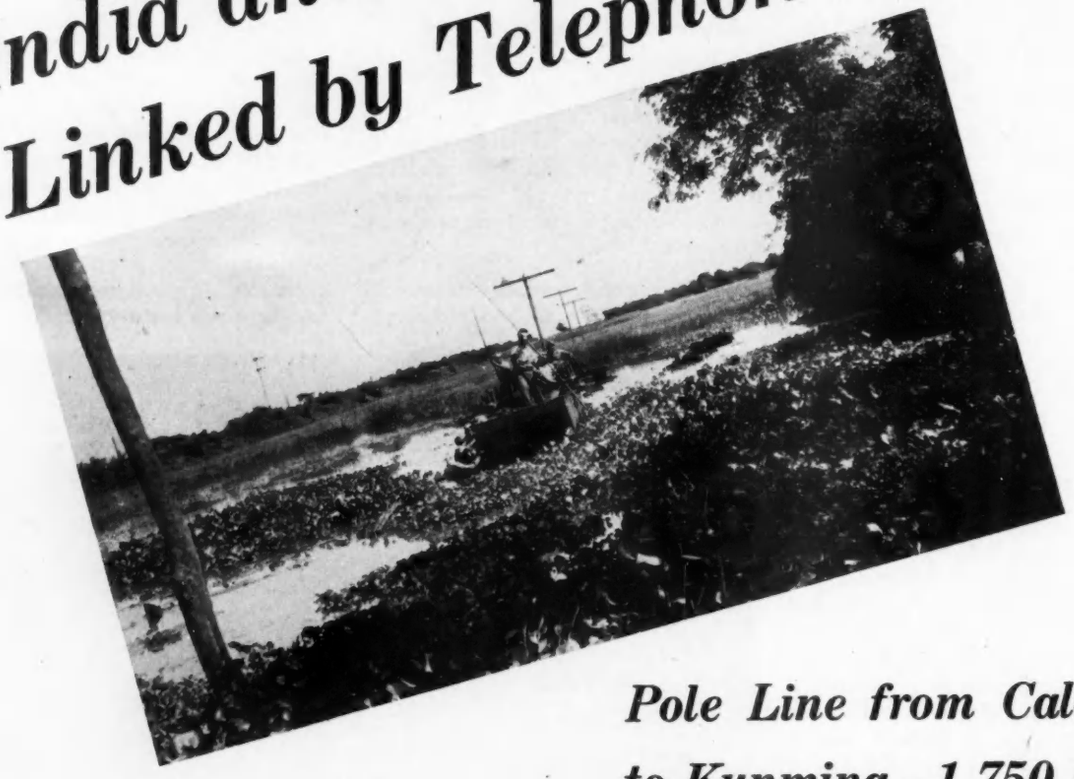
Leakage to Ground

A COMMON source of noise on metallic rural telephone lines is leakage to ground. If either side of a metallic line has a leakage path to ground, the induced power voltage (even though equalized by transpositions) can cause noise currents to flow to ground. In so doing voltages are developed across the connected subscribers' sets which gives rise to excessive noise values. The magnitude of the effect is inversely proportional to the resistance of the leakage path. Ground leakage values as high as 50,000 to 75,000 ohms will in many parallels, produce relatively high noise values.

The remedial measures are rather obvious. Tree limbs are a common source

(Please turn to page 68)

India and China Linked by Telephone



Pole Line from Calcutta to Kunming---1,750 Miles

FOR the first time in history, India has been linked to China by telephone and telegraph through the construction work of Signal Corps troops of the India-Burma theater. A pole line extending from Calcutta, India to Kunming, China completes a vast telephone system extending from Karachi, India on the west, through Burma, and into China.

Built under the general supervision of Brigadier General William O. Reeder, the line from Calcutta to Kunming is approximately 1,750 miles long, comparable to the distance between New York and Denver.

As tactical operations progressed, sig-Burma, it provided communications vital to the supply of air and ground combat and service troops dispersed along the entire route to China.

As tactical operations progressed, signal combat teams forged ahead with advance parties, setting up temporary telephone communication. As quickly as they could beat down the jungle and set up poles, crews in the rear established permanent communication on rapidly-built pole lines. When the monsoon season came, equipment had to be carried from camp site to work site through ankle-deep mud. On one occasion, more than 75 per cent of the crew were hospitalized with malaria.

Maintenance was as big a problem as construction. High winds and falling trees snapped poles and severed wires. Awkward bulldozers and heavy trucks often broke guy wires. Natives removed large sections of wire, which they used for everything but communications.

The men kept the pole line even with, and sometimes ahead of, the Stilwell Road. By means of spiral-4 cable, they provided wire communication from the advanced terminus of the pole line to combat troops in forward areas. Like the combat troops, they were harassed by enemy snipers. Keeping the spiral-4 in operation was a constant headache. Snipers not only took shots at the wire men, but they snapped the cable along the route, making trouble-shooting a dangerous necessity.

A feat of major proportions was performed when the crews laid submarine cable across the mile-and-a-half wide, swiftly-flowing Brahmaputra river. After several weeks preparation, the crews spanned the river with cable in 29 minutes. As soon as the line was finished, it was connected to the one then snaking its way down into Burma. The same troops who built the basic line for combat and road operations now set to work installing a full complement of wires, repeaters, carrier equipment, and switchboard and distribution systems.

Along with the poles and crossarms and wires went numerous switchboards, telephones and power-generating units at frequent intervals through what was probably the most undeveloped jungle and mountain terrain

in the world. Much of the equipment was flown to the construction area to save time.

All the equipment is in continuous operation and requires constant maintenance. Rains cause "short circuits" and create the everpresent menace of rust and corrosion of delicate instruments and intricate electrical wirings. Wind storms clog the mechanisms with dust. Screening material is required on all machinery to check the explorations of insects, lizards and bats. Fungus growth is a constant source of trouble. On one occasion, an ape was caught playing with the cords and plugs of a switchboard.

OPERATION and maintenance of the lines have tested the mettle of the signal men, just as building the line did the construction crews.

Pole line statistics show that more than 60,000 poles were set, 95,000 crossarms were used, almost a million insulators were attached to the crossarms, and more than 25,000 miles of wire were strung.

The line has two 8-position (operator) 800-line commercial switchboards, one 3-position 300-line commercial switchboard; and five Army switchboards—one with six positions and 540 lines, three with four positions and 360 lines, and one with five positions and 450 lines.

To connect by wire communication points along the Calcutta-Kunming pole line with New Delhi and Karachi, first India stop of the ATC's air route from the United States, three carrier systems were installed on existing British lines between Calcutta and New Delhi, between New Delhi and Lahore, and between Lahore and Karachi.

Although some relaying is necessary for long distance calls, telephone and telegraph service is available from Karachi to Kunming, the distance between the two cities approximating the distance from New York to San Francisco.

In addition to the U. S. Army Signal Corps, those who worked on the line included Indian pioneer troops and local Burmese and Chinese laborers along the route. Cooperation was given at all time, by the Indian Post and Telegraph system.

Credit for this greatest of all military communications project cannot be given to any single individual or small group of persons. The signal planners, the manufacturers and suppliers of the equipment, the builders, the maintenance men, and the operators have all contributed greatly to the present far-flung system of communications in the Far East.

(1) Two barges lashed together carry two miles of submarine cable which weighs 38 tons. Cable is being laid across the swiftly-running Brahmaputra River, India. (2) Carrying pole cut from the Burma jungle to a position in the pole line. Some of the poles were carried several miles and were extra heavy because they were mahogany. (3) Checking communications lines along the pole line in the CBI Theatre. The elephant, used for transport through swampy territory, drags along his lunch. (4) Along the Ledo Road, two H-fixtures, one in rear (one crossarm) being replaced by two-arm pole. (5) Testing the open wire circuits on the Delhi, India to Kunming, China pole line, near Bogapani, Assam, India. (6) Piling poles on stock pile in the Signal Corps supply yards at Lekha Pani, India. (7) Communication wires being strung on the bridge over the Brahmaputra River, near Bilasipara, India. (8) Laying wire communication lines to advanced positions prior the permanent construction of the pole line.—Signal Corps photos.

Telephone Engineer's RADIO COURSE FOR TELEPHONE MEN

Chapter 4, Section 2

Basic Theory of Tuned Circuits

By B. C. BURDEN
Technical Consultant
Lincoln, Nebraska

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Capacitance Rating of Variable Condensers

THE capacitance rating of variable condensers is generally expressed in terms of the maximum capacity which is obtained when the rotor plates are completely meshed with the stator plates. The capacitance depends upon the size and number of plates and the spacing between them. Condensers are often catalogued according to the number of plates they contain. Condensers are available having as few as two and as many as 43 plates, although modern receivers seldom employ condensers having over 21 to 23 plates.

The capacitance rating for average condensers in terms of plates is given in Table No. 1.

Unusually small and low capacitance condensers are used in high frequency (above 50 megacycles) receivers and transmitters and in connection with "serviceman adjustment" feature of some tuned circuits. These capacitances range from .00015 up to .00001 microfarads.

Table No. 1—Capacitance Rating of Variable Radio Condensers

Type of Condenser	Typical Capacitance Value
5 Plates	.0001 microfarads
7 Plates	.00015 microfarads
13 Plates	.00025 microfarads
17 Plates	.00035 microfarads
21 Plates	.000365 microfarads

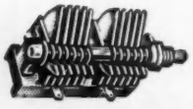

Fig. 45—A two gang condenser.

Condensers are generally mounted in tandem (see Fig. 45) that is, ganged together on one shaft so as to permit single control tuning. In the early days of radio each tuned circuit was controlled by a separate dial.

Other Features of Tuned Circuits

THE coils associated with the main tuning circuit in a radio have inductances ranging from 10 to 400 microhenries, depending upon whether or not the tuned circuit is the low or high frequency type. Typical coils are shown in Fig. 46. Coils used in radio circuits have from one or two to several hundred turns of wire. Most radio coils are generally of the air core type although some use powdered iron alloy cores.

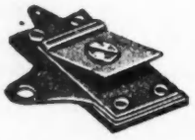

Fig. 47 — Semi-adjustable tuned circuit condenser.

Service-Adjust Type Tuned Circuits

SERVICE-adjust tuned circuits are used in radio circuits to permit adjusting several tuned stages so that they will all resonate at the same frequency. These usually consist of a small condenser which can be adjusted with a screw driver and which can be used to shift the capacitance over a narrow range. Fig. 47 shows one of these condensers which consists of two small metal plates separated by mica insulator with one plate under spring tension so that it tends to pull away from the fixed plate. A small screw adjustment permits moving it toward or away from the fixed plate, thus varying the capacity.

The capacitance of these small "trimmer condensers," varies from 5 to 100 micro-microfarads in the common types.

Fig. 46—Typical inductance coils used in radio equipment.

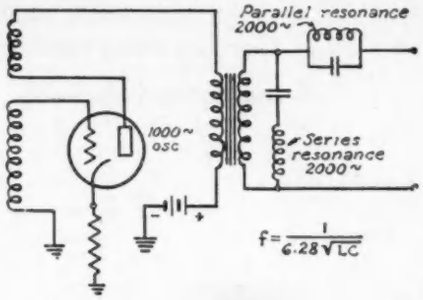

Fig. 48—Typical application of a fixed tuned circuit. (Note—this circuit shows how a parallel resonant circuit tuned to 2,000 cycles and a series resonant circuit tuned to the same frequency are used to suppress a 2,000 cycle harmonic put out by a 1,000 cycle oscillator. The parallel tuned circuit keeps the objectionable frequency from reaching the line and the series resonant circuit tends to short circuit resonant frequency coming from tube.

Fixed Type Tuned Circuit

IN the third type of tuned circuit previously mentioned we have a fixed capacitance shunted across a fixed inductance. A typical application of a tuned circuit of this type is in connection with power supply systems in which a filter is required to eliminate the ripple in the direct current output. The fixed tuned type of circuit is usually employed where a circuit must resonate at a relatively low frequency for which it would be impracticable to use an adjustable condenser. Fig. 48 illustrates a typical application for the fixed-tune type of circuit. In this figure both a series and parallel type of tuned circuit are used to suppress an objectionable frequency component in the output of the oscillator shown.

Sharpness of Tuning

AS previously pointed out, resistance in a tuned circuit is objectionable because it limits the maximum current that can flow at resonance, thereby impairing the *selectivity* of the tuned circuit. If a tuned circuit is to distinguish between two radio signals whose frequencies are close together, it is desirable and necessary that the resonance curve be *steep*. In other words, the current must rise rapidly in the tuned circuit at the resonant frequency and fall off to a low value at either side of this critical frequency. The sharpness of tuning of a resonant circuit is controlled by several factors. The resistance must be kept low by proper coil design using a wire which has a low radio frequency loss and a coil form having low dielectric loss (this is the loss due to the power which is absorbed by the form on which the coil is wound). In speaking of the resistance of an inductance we mean the resistance that results from the ohmic resistance of the wire, the skin effect resistance, the eddy current and hysteresis loss in the core

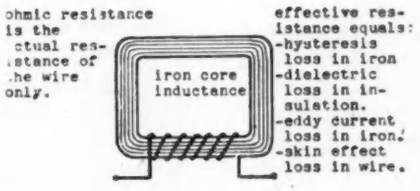
ohmic resistance is the actual resistance of the wire only.
iron core inductance
effective resistance equals:
-hysteresis loss in iron
-dielectric loss in insulation.
-eddy current loss in iron.
-skin effect loss in wire.

Fig. 49—Illustration on the difference between ohmic and effective resistance.

and the dielectric loss in the material on which the wire is wound. In other words the *A. C. or effective resistance.* The difference between D. C. and A. C. resistance is brought out by Fig. 49.

(Please turn to page 64)

"Even with all his money, he couldn't buy a new battery, so he had to get an electric eel."

(Courtesy RADIO-CRAFT)

Plan of Study
for students of "Telephone Engineer's RADIO COURSE for Telephone Men"

This special radio course has been prepared for the training of telephone men in the applications of radio principles to the wire communication field.

To make the course more complete and more effective, the author will present at the conclusion of each chapter a series of test questions. These questions are to be answered by students and mailed to the author for correction and grading. (Students need not take advantage of the test questions, grading, etc. unless they so desire.)

The first lesson appeared in the April 1, FORTNIGHTLY TELEPHONE ENGINEER; the second installment was in the April 15 TELEPHONE ENGINEER & MANAGEMENT; and the lessons have been continued in the same order. The balance of the course will appear in succeeding issues of FORTNIGHTLY TELEPHONE ENGINEER on the 1st of each month and TELEPHONE ENGINEER & MANAGEMENT on the 15th of each month.

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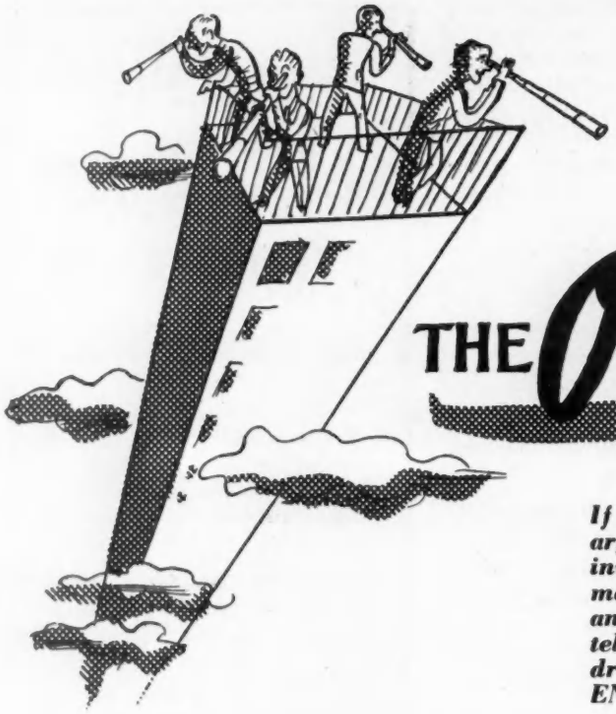


Conducted by the
Observer and his Gang

THE Observation Tower

If you have observations or even a friendly bit of argument suitable for use in this column, you are invited to send them along, which automatically makes you a member of the Gang. You will be anonymous—no names of telephone people or telephone companies are used in this column. Address "The Observer," in care of TELEPHONE ENGINEER AND MANAGEMENT.

Taxes vs. Employment

A non-telephone friend complained to us the other day about the taxes on his telephone bill. Said his last month's bill had more than $2.00 on it for taxes alone.

"You telephone people are getting to be as bad as the cigarette and gasoline people, when it comes to adding taxes to your charges," he expostulated. "How can you expect people to increase their use of your telephone service if you penalize them like that for doing it?"

We pointed out to him, of course, that us telephone folks didn't put the taxes on our service—a bunch of gentlemen down in Washington did that. We also called his attention to the fact that he pays taxes on some other things, too. Then we bought him a drink, and he bought us one—and we both paid plenty of taxes on that.

We've been thinking, since then, that our friend said something when he asked us the question about the increased use of telephone service—and it strikes us that this country is going to come up against the proposition, pretty soon, of whether the Government wants to collect more taxes, or to make more jobs.

We don't know how much high excise taxes decrease the buying and use of things on which they are imposed, but it must certainly decrease them some. It will likely decrease them a great deal more after the war, when everybody has to settle down to peacetime earnings instead of high wartime income or wages.

It stands to reason that everything that decreases the purchase and use of things, also decreases the amount of employment that is required to manufacture those things. That goes for telephone service as well as for anything else.

We hear that there is talk of doing away with all excise taxes, after the war, excepting those on liquor, tobacco and gasoline. That makes good sense to us—provided, of course that the Treasury Department or Congress doesn't get jittery about this loss of tax money, and hoist the taxes even more on gasoline. In some states right now the Government probably gets more net money from the sale of a gallon of gasoline than anybody else.

The most important problem this country is going to face after the war is that of employment. High taxes retard employment.

When Congressional action on the cancellation or reduction of excise taxes begins, it might be a good idea for the telephone industry to point out that telephone companies make employment, too—and that they can make more employment if these burdensome excise taxes are taken off of the telephone bill.

Company Magazines

WE have the urge to make some suggestions in this column, soon, about magazines published by telephone companies for employees. We have a number of ideas on the subject. Some of them have been picked up from the editors of company magazines. They're probably pretty good. Some are our own ideas—and they're probably open to suspicion as to their value, but we'd like to air them just the same.

We have quite a collection of telephone company magazines. We got them by hook or crook, hither and yon. But we do not have a complete collection of company magazines published by Independent companies; also some of those we do have are quite old and, therefore, probably not up to present standards.

We'll appreciate it if anyone responsible for the publication of a telephone company magazine will send us a late copy of the publication. That would help us (if we receive a number of company magazines) to say our say about them—and we hope our suggestions will be of some help.

We've published a company magazine ourself, incidentally, and we know the kind of job it is—and how hard it is, sometimes, to get the necessary amount of the right kind of stuff to fill the columns. The editor of a company magazine has no easy job, and he and his correspondents are entitled to a lot of praise for the good work they do.

Farms Go Up and Down

SPEAKING on the question of "Why fewer farm telephones?", Gang Member No. 81 has given us some first-

hand, direct from the soil statistics which throw some light on the question.

These statistics refer to the county in which Gangster No. 81 lives and operates some telephone exchanges. It is a typical farming county in an agricultural Mid-Western state.

The supervisor in that county of the 1945 farm census has just finished his job, and gave our Gangster the following figures:

In 1935 there were 2,749 farms in the county. In 1940 there were 2,599 farms, and in 1945 there are 2,488 farms.

But—in 1935 there were 331,596 acres in farms in the county, in 1940 there were 327,856 acres, and in 1945 there are 333,305 acres in farms.

So the average farm in the county had 121 acres in 1935, 126 acres in 1940, and has 134 acres in 1945.

There, says our Gangster friend, is part of the answer to the decrease in the number of farm telephones—farms are going up in size and down in number, year after year.

How Long Will Things Last?

LAST month we ruminated on the question of whether the necessity for making things last while they were not replaceable during the war would create a habit of making things last longer, after the war.

We got at least a partial answer to that question the other day from a friend of ours who is an official of a large taxicab company.

It happened that we were riding in a taxicab which had one of those friendly conversational drivers. During the trip he said, "Well, the old bus is going along pretty good this morning— at least for a car that has gone over four hundred thousand miles."

It gave us a surprise to think that any automobile could go more than 400,000 miles and still travel and, although the driver insisted that he was right, we got out of that cab with a lurking suspicion that, as the English say, he was spoofing us. So we called our friend in the taxicab company and asked him if the driver had told us the truth.

"Probably so," said our friend. "We've got a number of cabs on the streets of this town that have gone more than 400,000 miles. Practically all our cabs have been driven more than 300,000 miles. And they're still going; good for a lot more miles, we think."

"What are you going to do with those veterans after the war?" we asked. "Patch them up and keep them rolling?"

"Heck, no," rejoined our friend. "Every one of those old babies will head straight for the junk pile just as soon as we can get a new cab to replace it."

So that's that, so far as taxicabs are concerned. And, said our friend, the new cabs are going to be something out of this world. Really comfortable seats for five (or maybe six) people, he said; possibly sliding doors—and a lot of new gadgets and comforts for the passenger.

More About Management

GANGSTER No. 112 sort of thumbs his nose at some of the ideas of Gang Member No. 185 about management, as duly reported in our March column.

Gangster No. 112 says there are no such things as rules of management. He says there are principles of management, but one trouble with a lot of managers is that they try to stick to a lot of rules when they should be willing to break away from the old rules and blaze new paths.

He thinks managers are inclined to depend too much on their experience, and too little on the existing facts—and the facts, he says, change constantly. But to get the facts, he opines, means work, and it's a lot easier to decide or do a thing on the basis of past experience than it is to dig up all the facts about existing conditions and make the decision on them.

He says there are some basic fallacies about management that are frequently responsible for the lack of success, or even for the bankruptcy, of many small businesses. One of these fallacies, he thinks, is the statement you hear so often that a business failed for lack of capital. Obtaining capital, says Gangster No. 112, is merely a part of management, and if the management had been on its toes it could ordinarily have gotten all the capital it needed.

Another fallacy, he says, which applies specifically to the telephone business, is that the company was unsuccessful because its rates were too low. Again, says this Gangster, if the management had been alert its rates would not have been too low—because getting the right rates is just a part of management.

We don't pretend to be able to appraise all the rights and wrongs of this argument about management; all we know is that a well-managed business usually succeeds better than one that is poorly managed. And we also know that the more argument there is about any subject, the more likely it is that we'll all learn something about it.

Are Them Days Gone Forever?

GANGSTER No. 175 has sent us a clipping from a weekly small-town newspaper published in Kansas. One item in it, he says, may have some bearing on the question of why fewer farmers have telephones now than they had a number of years ago.

The marked item is from the column in the newspaper headed "Twenty-Nine Years Ago." The item, which was reprinted from an issue of the newspaper 29 years ago, is as follows:

"The F phone line will have a Hallowe'en social at the F. L. Smith home Friday night."

This, says Gang Member No. 175, is an echo of the old days when the farmer-owned switched telephone line was more than just a telephone line—it was also a sort of social club. Nowadays, says this Gangster, it is just a telephone line—and maybe that's why it is not, in these days, so important in the every-day life of the farming population.

Times Do Change!

A philosopher once said that the great and lasting changes in the life and ways of a people are usually recognized only by history—that the people themselves seldom realize that they are going on at the time they are going on.

We have been thinking that maybe some sort of an unrecognized revolution is now taking place in the plant side of the telephone business.

All kinds of new things are bobbing up and being put to use in construction. Long pole lead spans, high tensile strength wire, a new method of hanging cable, shorter poles for some types of lines, and so on. We understand that new kinds of insulation for wires will be available after the war, and that new types of cable—particularly cable suitable for burying in the ground—will be ready for use.

The telephone plant man will need to have eyes in the back of his head to keep up with the new ideas and methods of plant construction after the war.

NEWS Briefs...

Service to Great Britain For General Public

Radiotelephone service between the United States and Great Britain is again available for general public use. Service was resumed June 23, according to an A.T.&T. announcement. During the European war only official and press calls have been permitted over the facilities between the countries.

In addition to this relaxation of wartime restrictions, the rates for calls between this country and Great Britain were reduced on June 23. The charge for a three minute call between New York and London is now $12 instead of $21.

$12 looked like a real bargain to G. I. Joes. For the first few days of the resumed service, U. S. soldiers so jammed the circuits with a flood of calls home that temporary reservations had to be placed.

Cutover to Dial

The Commonwealth Telephone Company recently put into service a new dial system at its Stone Lake (Wis·) exchange. With necessary new numbers for all subscribers, the new telephone directory was distributed in advance, and customers were advised to please look up numbers before placing calls. The novelty of the dial system was a tempting stimulant to some of the customers that first day.

System to be Modernized

V. L. Bradley, owner and manager of the Argyle and Kennedy Telephone Exchanges, recently announced that plans have been completed and priorities secured to completely modernize the Kennedy (Minn.) exchange. Work is to be started at once, and as soon as the new system is in operation, an increase in rates will be put into effect.

A new building is to be erected and an automatic switchboard installed: open iron wire will be replaced with cable and insulated wire in village limits and rural lines will be rebuilt and made metallic. Present telephones are to be replaced with modern instruments.

Increased Rate Approved

The petition of the Campbell Rural Telephone Company, Wilkins County, Minn. serving approximately 92 exchanges, has been approved increasing the rural multi-party rate from $1.33 to $2.00.

Collection of Hotel Surcharges

The Federal Communications Commission has been informed that numerous hotels throughout the country are continuing to collect "surcharges" or "service charges" on interstate and foreign long distance telephone calls, in addition to the regular tariff charges of the Bell System Telephone Companies on file with the FCC.

A tariff provision filed with the Commission by these telephone companies, effective February 15, 1944, expressly prohibits the collection of any such charges. The legality of this tariff provision has been recently affirmed by the Supreme Court of the United States in decisions on May 21 and May 28, 1945.

The public and all hotels, apartment houses and clubs are again informed that the collection of any such extra charge by any hotel, apartment house or club is contrary to this tariff provision and is therefore illegal under the provisions of the Communications Act of 1934. Any hotel, apartment house, or club which carries on this illegal practice renders itself subject to immediate legal action.

Rate Reduction on Long Distance Calls

On July 1, there was a reduction of rates on interstate long distance calls applying on calls between points which are 791 miles or more apart. The reduction will amount to more than $21,000,000, annually. The day station-to-station rate from New York to San Francisco, formerly $4.00 for the first three minutes, is now $2.50.

Rates Reduced to Spain

Charges for radiotelephone service between the U. S. and Spain were reduced by about fifty percent beginning July 5. The rate for a three-minute conversation between New York and Madrid was lowered to $12.00 under the new plan. The overseas telephone service between Spain and the United States re-opened for general calling on June 15.

Plan Conversion to Dial

John H. Spengler, general manager of the Urban Telephone Company, Clintonville, Wis., recently announced plans to convert to automatic dial at the Marion exchange, permission having been granted and permits received. The project is estimated at $43,000 and is expected to be completed in October or November of this year.

German Exchange

The organization of the first telephone group, composed of anti-Nazi Germans, in occupied Germany is credited to Captain Paul E. Griffith of the Signal Corps, former Illinois Bell engineer and former National Federation of Telephone Workers president, according to word received about Capt. Griffith's activities. In the German city, one of the most beautiful and historic spots in the Reich before the war and now "desolated," Captain Griffith is understood to have recruited a small telephone and postoffice organization from the refugee camp, including the former chief engineer of the telephone system who had been ousted because of being partly Jewish. They uncovered the cable schematics through a woman refugee who had been chief cable tester of the German PTT.

Rural Expansion Planned By New Owner

Roy L. Johnson, Whittier, California, has purchased the Independent Telephone Company, Langford, S. D. from Herman Ogren, who has managed the exchange since 1938. Mr. Johnson plans to repair and reconstruct the lines and expand the system to rural communities.

National and State Association NEWS

New York State Association Elects Directors and Officers

DUE to the cancellation of their annual conference this year, the N. Y. State Telephone Association's election of directors was conducted by mail, and the following directors were elected:

For one year: Frank T. Byrne, Rochester; Frank D. Fancher, Middletown; Louis H. Meyer, Johnstown; William A. Seely, Norwich; John H. Wright, Jamestown.

For two years: S. F. Busfield, Deposit; Lewis C. Manley, Addison; H. J. Pohl, Vernon.

Other directors whose terms carried over and expire in 1946: Don F. Davison, Spencerport; Fred S. Florance, Monroe; Don T. Todd, Edwards.

After the election of directors an organization meeting was held in Syracuse on June 14 to elect new officers. Fred S. Florance, secretary and general manager of the Highland Telephone Company at Monroe was elected president; William A. Seely, president of the Chenango & Unadilla Telephone Corp., Norwich, was elected vice president; Frank D. Fancher, vice president of the Orange County Tel. Co. of Middletown was elected treasurer and Don F. Davison, president of the Ogden Telephone Company Spencerport, was elected secretary and assistant treasurer.

A resolution was adopted by the directors expressing their appreciation for the time and effort that have been given by the retiring officers and directors toward the conduct of the association activities. A special tribute was paid to the excellent job that has been done by the retiring president, Louis H. Meyer, who has so capably filled that office for the past three years.

Attending the Board of Directors' meeting of the New York State Telephone Association. L to R, back row: H. J. Pohl, Lewis C. Manley, Erwin A. Adams (retiring secretary & asst. treasurer), Don W. Walker (executive secretary), Don T. Todd, Edwin B. Babeaux (retiring treasurer) and S. F. Busfield. L to R, front row: Frank D. Fancher, Don F. Davison, Lewis H. Meyer, Fred S. Florence, William A. Seely and Frank T. Byrne. John H. Wright, director, attended but is not in the picture.

Nebraska Association Holds Round-Table Discussions

Pending rural telephone legislation, rate schedules and many other subjects of interest to telephone companies were talked over at the June 12 Holdrege, Neb. district conference.

THREE district conferences were held by the Nebraska Telephone Association last month: June 12 meeting at Holdrege, June 14 at Norfolk and June 19, at Beatrice, Nebraska.

The meetings began at 9:45 A. M. and were round table discussions in which loans to small business, wages and hours, bills in Congress pertaining to statute of limitation, jobs for returning veterans, legislative reductions, improved telephone service and rural telephone legislation bills in Congress were thoroughly discussed.

George M. Kloidy, secretary-treasurer of the association, reports that

(Please turn to page 70)

Highlights of the Communications News

Important Communications developments of the past month, briefed for busy readers

by
ROLAND C. DAVIES
Editor, Telecommunications Reports

Revised Priority System

THE revised and simplified priority system, aimed toward the ultimate discontinuance of priorities assistance for "virtually everything except military requirements" which was announced last fortnight by WPB Chairman Krug, will be helpful to the telephone manufacturing industry during the six months' transition period from July 1 to December 31, in the opinion of WPB Communications Division Director Leighton H. Peebles.

The manufacturing companies do not anticipate any great difficulties with the revision of the priorities procedure under PR-28 and 29. The new priorities system will be introduced gradually during the period from July 1 through December 31, which will be known as the "transition period." Mr. Krug announced that, if there should be any inconsistency between PR-29 and any other WPB regulation or order, PR-29 controls "unless the other expressly states the contrary."

As a result of his last week's inspection of telephone manufacturing in Chicago, St. Paul and Duluth of the Western Electric plants, Mr. Peebles expressed the view that there will be substantially increased momentum in the production of civilian central office equipment and telephone instruments, but he cautioned that it will be a long time before the telephone companies can fill every subscriber order. He also conferred with the Illinois Bell and the Northwestern Bell top executives. Last week, Communications Division Deputy Director Maynard Cook consulted with Automatic Electric and the Army Air Forces procurement officials at Chicago and Dayton, respectively, on the AAF requirements.

Mr. Peebles emphasized that the telephone industry still wishes to have the schedule of precedence for installations maintained in Order U-2. During July the number of appeals reaching his Division has been going down, but that may be natural due to the vacation season. The general trend, however, in regard to appeals is downward as a result of the broader schedules of precedence and revised administration of the order. But the Bell System is recording up to the present a steady rise in applications for mainline service.

Mr. Peebles noted that all returned veterans are now being served with telephone facilities; that installations in the case of changes of business addresses are being kept under control and installations in the case of changed residences also are proceeding satisfactorily. Applications of businesses for telephones are steadily rising.

Priority applications from the telephone manufacturing industry have almost dropped off to nothing. The only restriction remaining under U-3 for buildings' materials is now being scrutinized for possible revision. Building construction applications in recent weeks have been comparatively minor. It is felt that purchasing departments of telephone manufacturing companies can canvass the materials situation more actively under the new transition priorities system.

Under the new priorities rating system, the present AA rating method and the Controlled Materials Plan will be discontinued at the end of 1945 and replaced by a system in which the AAA rating will still be assigned in emergencies as under existing procedures, but a new MM rating will be assigned by military agencies. WPB itself will assign the MM rating only in cases where it is clearly necessary for the war effort or for requirements of similar urgency.

During the transition period from July to Dec. 31, the MM rating will be equivalent to AA-1. The AA ratings also will be retained for certain materials, such as textiles, if it is not practicable to adapt existing controls to the new system.

Beginning Oct. 1, 1945, no more AA ratings will be assigned by WPB or other agencies except for deliveries to be made before Jan. 1, 1946. Prior to Oct. 1, 1945 WPB will cancel outstanding AA ratings calling for delivery after the end of 1945, whenever this can be done without interfering with war production or war-supporting activities. Further details on this phase of the transition will be announced later.

Beginning as soon as possible after July 1, 1945, the military services will assign the MM rating to orders and contracts placed during the transition period for deliveries during or after the transition period. They also may change existing orders with AA ratings to MM ratings if necessary to assure delivery on schedule. WPB will if necessary provide additional procedures to give priorities assistance for war-supporting or highly essential civilian purposes.

FCC

ENTRY into the private practice of law in Washington was announced June 30 by Commissioner Norman S. Case upon his retirement from the FCC on which he had served for 11 years since its creation in July 1934. Commissioner Case, who before coming to the Commission had served three times as Governor of Rhode Island, is becoming associated in law partnership with Col. Frank W. Wozencraft, who recently left the Army Signal Corps after nearly three years service as Communications Secretary of the Combined Communications Board.

At press time we understand the Senate Interstate Commerce Committee will hold a hearing July 12 at 10:30 a. m. in its Committee Room at the Capitol on the confirmation of former Vermont Governor William Henry Wills to the FCC to succeed Commissioner Case. Every indication is that the Committee will approve the recommendation for confirmation and the Senate will act on the confirmation during the early part of the week of July 16.

Surplus Disposal

THERE is a definite possibility that surplus radio and electronic components might affect the postwar market in that field unless the manufacturers hold to the strict policy and handle the disposal problem with a reasonable amount of care. No serious problem, however, will face the telephone industry regarding surplus property in the postwar market, officials handling the capital goods surplus

property disposal program, indicated this week.

In their statements to TELEPHONE ENGINEER, the government surplus property officials naturally are concerned over the disposal situation because of the political implications and potential Congressional investigations if the military surpluses are not sold at prices reasonably near the original cost to the armed forces. On the other hand, the radio-electronic manufacturing industry feels that only a small portion of the military surpluses will have commercial usage and predicates this viewpoint on the rapid obsolescence of the radio-electronic art and equipment.

In the case of the telephone industry, the outlook is much rosier from a postwar market standpoint. The smaller Independents, it is thought by the government surplus authorities, will find the surplus equipment most useful in their rural service expansion. It was noted that the military telephone wire which may be declared surplus is generally of a different gauge than is used by telephone companies, but may be found useful for rural telephone service as drop wire. However, the field wire in the overseas theatres has a very low rate of recoverability.

Turning to the surplus telephone equipment the DSC officials said that the surplus that will accumulate in this field would help the industry rather than take away from the postwar market.

In most cases, the large manufacturing and operating companies will not feel any effects of surplus telephone equipment that will be released, it was stated by a SPB official in charge of this field. It is expected that this equipment, however, may aid materially the situation of rural farm telephone expansion and the situation of the small Independent telephone companies which are unable to meet the high cost of overhauling and expanding of present facilities.

Most of the material that will be made surplus will not be the type used by the large operating companies. Such is the case for example in any quantities of military telephone wire that will be declared surplus. This particular wire is of an "off-gauge" size and would not be accepted for use by the larger companies.

There will be, however, a limited number of small components that could be used in the manufacture of new instruments. This undoubtedly will not become any problem because these small parts can be turned back to the industry with little or no impact.

It is still too early to make any factual estimate as to just what the situation might be because as time goes on it will be apparent that many fluctuations will take place in both the radio, electronic and telephone field as far as surplus is concerned. So far there has been but a trickle and more than 70 percent of the material has been returned to the assembly line to be built into units for essential civilian radio services.

Radiotelephone Service

THE reduced overseas radiotelephone rate of $12 for a three-minute call was placed in effect by the American Telephone & Telegraph Co. July 1 between the United States and Italy, Spain and Switzerland. This follows the inauguration of the same reduced rate June 23 for service between the United States and Great Britain. Public calls with those three countries are now permitted. The reduction of the rates with Spain was in the final process of negotiation.

The opening of direct radiotelephone communication between Norway and the United States for public use is expected to occur late this year as a result of a WPB grant of priority assistance to the Norwegian government. In announcing this priorities aid by the WPB June 26 it became known that Norway will purchase radiotelephone equipment in the United States for installation in Oslo. Priorities aid for equipment has also been given France and is expected to result in the reestablishment of the prewar radiotelephone circuit with Paris probably this fall. Beglium and Holland also are making plans for the reopening of their prewar overseas telephone links.

Check your safety rules and practices regularly to save precious manpower.

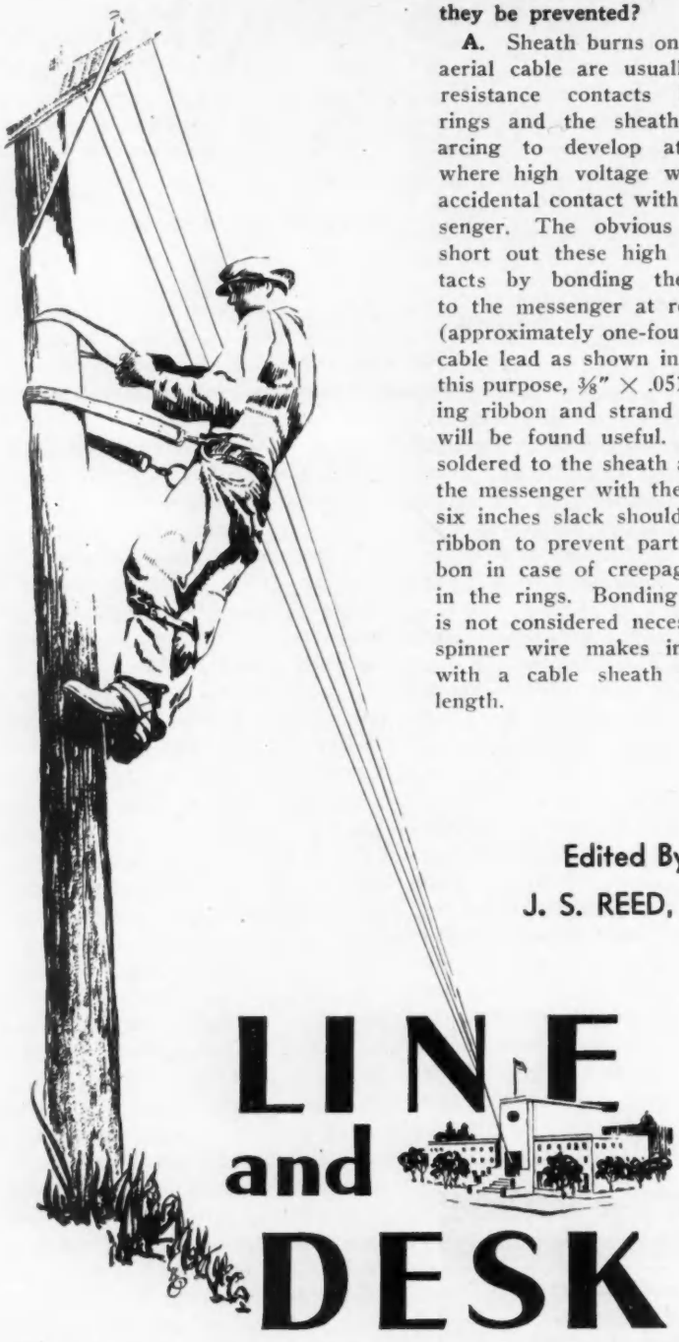
The $12 rate to Italy, Spain and Switzerland meant a virtual halving of the previous radiotelephone charges as the three minute call rate has been up until now $22.50. Portugal, so far, has not authorized the new rate, but calls with that country are comparatively few. The previous rate to Italy was $24.

Michigan Rate Hearing

STATING that "any cut in telephone rates would mislead the public to believe that we could permanently give telephone service at those rates," T. N. Lacy, vice president and general manager for the Michigan Bell Telephone Company testified before the Michigan Public Service Commission at a rate hearing in Detroit on June 29. This is a continuation of a rate case started last year resulting in a Commission order directing Michigan Bell to refund $3,500,000 of its 1944 revenues to its customers. The circuit court judged the order illegal on the grounds that the Commission had exceeded its authority in ordering retroactive rate adjustments, and the court's decision is now being appealed.

The possibility that ever higher rates may be needed was voiced by Mr. Lacy in response to a question following his prepared statement outlining the important factors affecting future rate levels. The factors included in the Vice President's statement were: the now existing wage levels and the possibility of further increases; need for adding to the number of employees on the payroll; additional plant per telephone service; increase in expense during periods of heavy activity; and loss of certain wartime revenues. Possible reductions in tax rates and the elimination of certain types of expense by wartime conditions were enumerated as partially offsetting factors by Mr. Lacy, who concluded that considering these factors "we are unable to conclude that telephone rates in Michigan will not need to be increased; certainly, they should not be decreased now."

Ferry B. Allen, chief accountant for Michigan Bell, testified that further earnings of the corporation constitute the chief factor for new capital. He pointed out that the Bell System after the last war was unable to issue stock and had to borrow money to increase its already heavy debt ratio with a slow recovery. The System must have a return of 8.69 percent on its equity capital, and over-all earnings required should be 6.81 percent. Cross examination started at Lansing July 9.



LINE and DESK

Edited By
J. S. REED, JR.

Q. What is the cause of excessive sag in open wire lines?

A. Sometimes the cause of an unusual amount of wire sag is overloading of the wires by ice, more often though, it is the result of inadequate guying, especially at dead end points. Before you attempt to cut out slack in line wires, it is advisable to examine the line for slack guys or guys with anchors that are not holding the wire load. An additional guy may be placed or a heavier anchor installed and the guy pulled to take out the line slack. At corners of heavy wire lines, raking the pole towards the guy will help take some of the load off the guy.

Q. What is the cause of sheath burns on aerial cable and how can they be prevented?

A. Sheath burns on ring supported aerial cable are usually due to high resistance contacts between cable rings and the sheath which causes arcing to develop at these points where high voltage wires come into accidental contact with the cable messenger. The obvious remedy is to short out these high resistance contacts by bonding the cable sheath to the messenger at regular intervals (approximately one-fourth mile) in the cable lead as shown in Figure 1. For this purpose, $\frac{3}{8}'' \times .051''$ copper bonding ribbon and strand ground clamps will be found useful. The ribbon is soldered to the sheath and attached to the messenger with the clamp. About six inches slack should be left in the ribbon to prevent parting of the ribbon in case of creepage of the cable in the rings. Bonding of spun cable is not considered necessary since the spinner wire makes intimate contact with a cable sheath throughout its length.

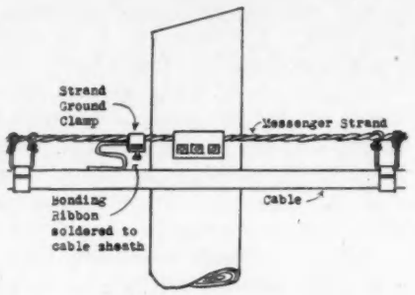


Fig. 1—Illustrating method of bonding cable sheath to messenger strand.

Q. We are having difficulty in satisfactorily cleaning station protectors in our shop, especially the porcelain bases which often seem to be coated with some indissoluble substance. Can you recommend some method that will properly clean the protectors?

A. The following procedure has been successfully used by a well-known telephone company to recondition their station protectors:

1. Dismantle the protectors, removing the fuses, protection blocks, and the metal cap covering the protector block assembly. (It is not necessary to completely dismantle them unless it is desired to salvage parts from damaged protectors.)

2. Immerse the porcelain bases in a strong solution of a good cleansing agent such as Double XX or Wyandotte Detergent and allow them to remain overnight in the solution. In the morning go over each part with a scrub brush to remove the loosened film of dirt, kalsomine, or paint and rinse the parts in clear water. Set them aside in a warm place until they are thoroughly dry.

3. In the case of the few remaining porcelain bases that are coated with paint that cannot be removed by the foregoing method, immerse the bases in paint remover sufficiently long for the paint to be loosened and then brush off the film of paint. Wash and rinse the bases as before.

4. Since the treatment with the cleaning solution may in some cases loosen the wax in the conductor channel in the back of the porcelain bases, all loose particles of wax should be removed and the channels refilled with a mixture of sealing wax and beeswax. The wax may be melted into the channels with a soldering iron or fed from an electric wax dropper.

5. Reassemble the protectors with good fuses and protector blocks and test each to make sure they will function properly. The exchange ringing circuit in series with an a-c buzzer and test prods is satisfactory for this purpose.

Free Help on Problems

If you don't see a ready answer to your questions, Let TELEPHONE ENGINEER's staff of technical men tackle it for you. This is a free service. Your question and the resulting answer may not only solve your problem but help the many other telephone men reading these columns. Jot your questions on a postcard and look to LINE and DESK for reply. If your problem needs immediate attention, please enclose a stamped addressed envelope for mail reply.

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TYPE SX
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TYPE UX
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When your equipment is Strowger Automatic, your exchange is always ready to grow — at minimum cost, without fuss or bother, without re-arrangement or re-wiring. More than any other type of switching equipment, Strowger Automatic is ***designed for growth.***

Strowger Automatic exchanges grow by simple addition, beginning with standardized frames to mount switch "shelves." On these shelves, in turn, individual switches are quickly "jacked in" as required. . . . To expand your exchange, merely slip new switches into place on existing shelves. For further growth, add complete shelv necting cabling to the terminal blo of each shelf. And for maximum ex additional frames with shelves and required. No matter how large the be, existing equipment and wiring not disturbed.

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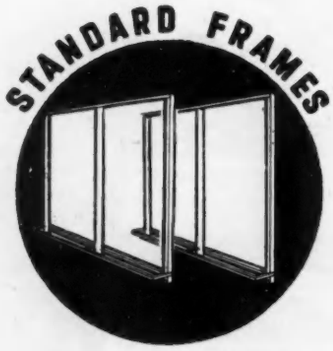

. . . are rigid, welded-and-bolted steel structures of standardized design, upon which the switches and shelves are easily mounted.

PLUS

. . . provide mounting facilities and switch jacks, with all wiring completed to a terminal block at the end of each shelf.

PLUS

. . . each comprising a complete switch mechanism and associated relays—wired, with wiring terminated on "jack" on base.

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PAINS"!

nplete shelves, simply con-
term al block at the end
maximum expansion install
shelves and switches as
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and wiring are ordinarily

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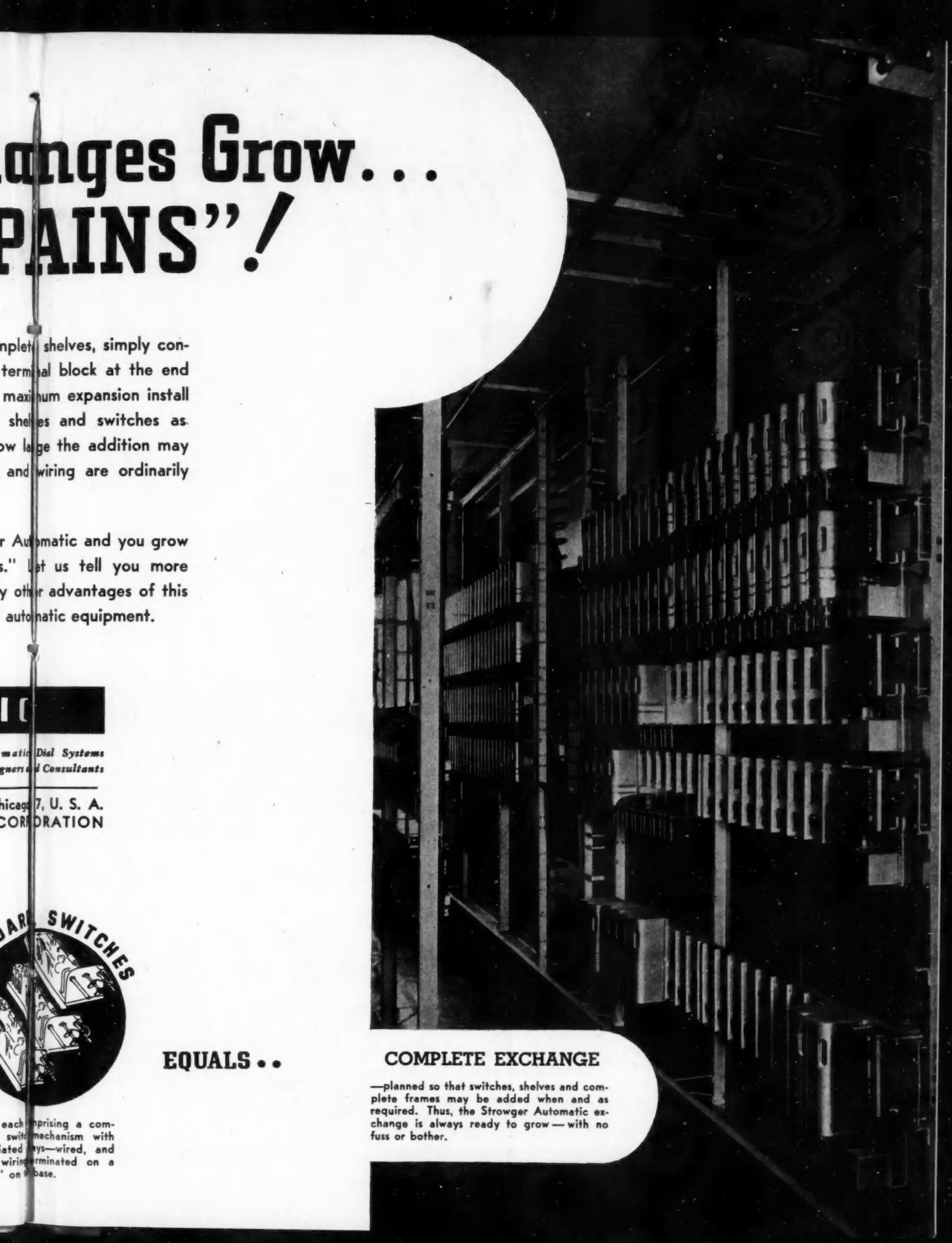


each comprising a com-
switch mechanism with
lated keys—wired, and
wiring terminated on a
" on base.

EQUALS . .

COMPLETE EXCHANGE

—planned so that switches, shelves and complete frames may be added when and as required. Thus, the Strowger Automatic exchange is always ready to grow — with no fuss or bother.

Personalities

George J. Dempsey, veteran member of the FCC Engineering Department, is now serving in the key position of chief of the engineering and valuation section of the Common Carrier Division, together with his former duties as BWC—FCC liasion official with the WPB Communications and Radio-Radar Divisions. He heads two former sections (engineering) which have been consolidated.

●

Frank M. Malone became Alabama manager of the Southern Bell Telephone and Telegraph Company July 1 when **William A. Steadman** retired from the position which he has held since June 1933.

●

Mrs. Eva McDougall, 75, after 33 years as a switchboard operator for the Elizabeth (Ill.) Exchange of Northwestern Tel. Co. of Freeport, has resigned. Reason: failing health. The number of subscribers had increased from 24 to 250 in the 33 years.

●

The Cincinnati (Ohio) & Suburban Bell Telephone Company has announced the appointment of **Edgar D. Coons** as assistant to the vice president, in charge of personnel relations, the appointment of **V. U. Fischer** as assistant to the vice president, in charge of labor relations, and the future retirement of **Louis C. Nowland,** Chief Engineer, after 47 years of continuous service, who will be succeeded by **B. S. Wagner,** building and equipment engineer.

●

The honorary degree of Doctor of Engineering was recently conferred on **Major General Harry C. Ingles,** Chief Signal Officer of the Army, by the trustees of the University of Nebraska. The degree was conferred for outstanding accomplishments in the field of communications engineering.

●

John T. Penn, president of the Manawa (Wis.) Telephone Company died at the home of his daughter in Bakersfield, California recently.

John J. Moran

John J. Moran, formerly general plant superintendent of Ohio Consolidated Telephone Company, of Portsmouth, is new general manager of Middle States Utility Company, Plattsburg, Missouri, which operates about 57 exchanges.

●

Lt. Joseph K. Funkhouser is back with the Harrisonburg (Va.) Telephone Company at his former post as general commercial manager following his release from the Armed Forces.

●

Edgar W. Adams, general patent attorney of the Bell Telephone Laboratories since 1937, was appointed general patent attorney of the Western Electric Company, June 25, succeeding **F. T. Woodward,** who becomes consulting patent attorney for Western Electric.

●

Commissioner George L. Timmons has been elected Chairman and **Commissioner Edward Winberly** has been named vice chairman of the South Carolina Public Service Commission for next year, beginning July 1.

Don F. Davidson, who operates the Ogden Telephone Company at Spencerport and the Midstate Telephone Company at Hilton, N. Y., has recently purchased the Hilton Telephone Company, serving approximately 693 subscribers, from **J. Harlan Cooper.**

●

Mrs. Birdie Ricks, wife of **Fred Ricks,** plant manager of the Boscobel (Wis.) Telephone Company passed away June 22 after a long illness. **Mrs. Ricks** started as an operator with the company in 1908 and served in that capacity at various intervals for about 37 years.

●

Dr. Ray Matkin, president and assistant manager of the Rockport (Mo.) Mutual Telephone Company, reports extensive postwar plans by their board of managers for expansion, repair and rehabilitation of facilities.

●

D. R. Shetterly was recently named a director of the Garden Valley Telephone Company, (Erskine) Minn. and **Carl M. Ostby** is the new general manager. Other directors chosen: **H. P. Melvin Peterson, Peter Bakken** and **Albert Anderson.**

●

John H. Agee, vice president and general manager of the Lincoln (Neb.) Tel. & Tel. Company gave an interesting talk before the Seward (Neb.) Rotary club recently.

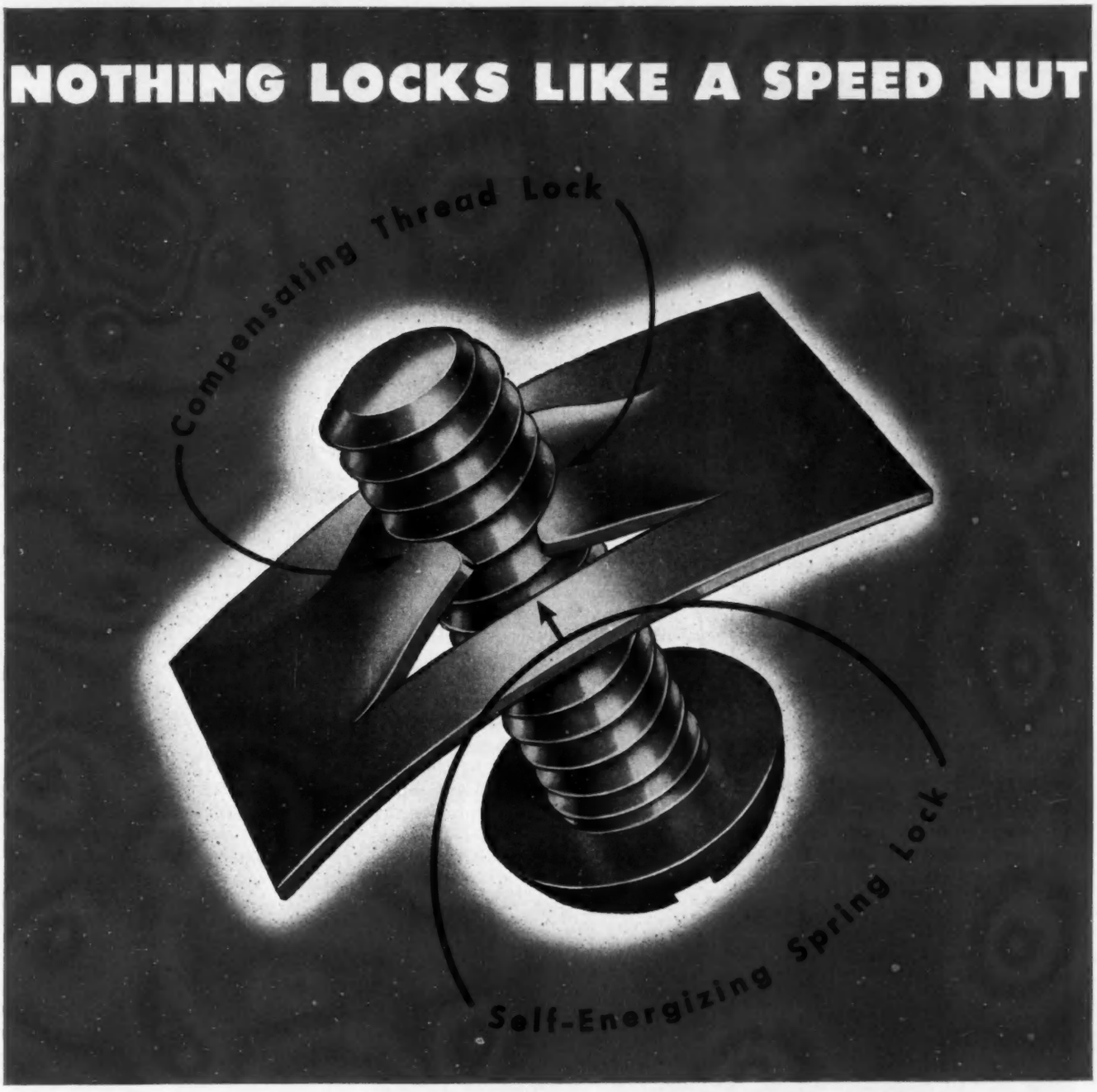
●

Claude Wickard, formerly Secretary of Agriculture, was sworn in as Administrator of the Rural Electrification Administration (REA) on July 2. No changes in administration have been announced. **Wickard** will divide time between his Washington and St. Louis offices, REA headquarters in St. Louis.

●

C. H. Knapp, 77, father of **Colby H. Knapp** popular representative of the Stromberg-Carlson Company, passed away July 5 at Lincoln, Ill., following recurring heart attack.

NOTHING LOCKS LIKE A SPEED NUT



SPEED NUTS are the only fastening devices that provide a COMPENSATING thread lock and a SELF-ENERGIZING spring lock. TWO distinct forces are exerted on the screw, as the SPEED NUT is tightened.

First, a compensating thread lock, the two arched prongs moving inward to engage and lock against the root of the screw thread. These free-acting prongs compensate for tolerance variations, and function perfectly on oversize or undersize screw or bolt threads.

Second, a self-energizing spring lock, created by the compression of the arch in both the prongs and base. The combined forces of the thread lock and spring lock definitely eliminate vibration loosening.

SPEED NUTS, proven in pre-war commercial industry and now boosting the production of airplanes, are ready to assist you in the assembly of post-war metal, vitreous enamel, plastic or wood products. Literature is available on over 3000 shapes and sizes, for standard or special assemblies.

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FASTEST THING IN FASTENINGS

COMMUNICATIONS and ELECTRONIC Developments

A Voice by Mail

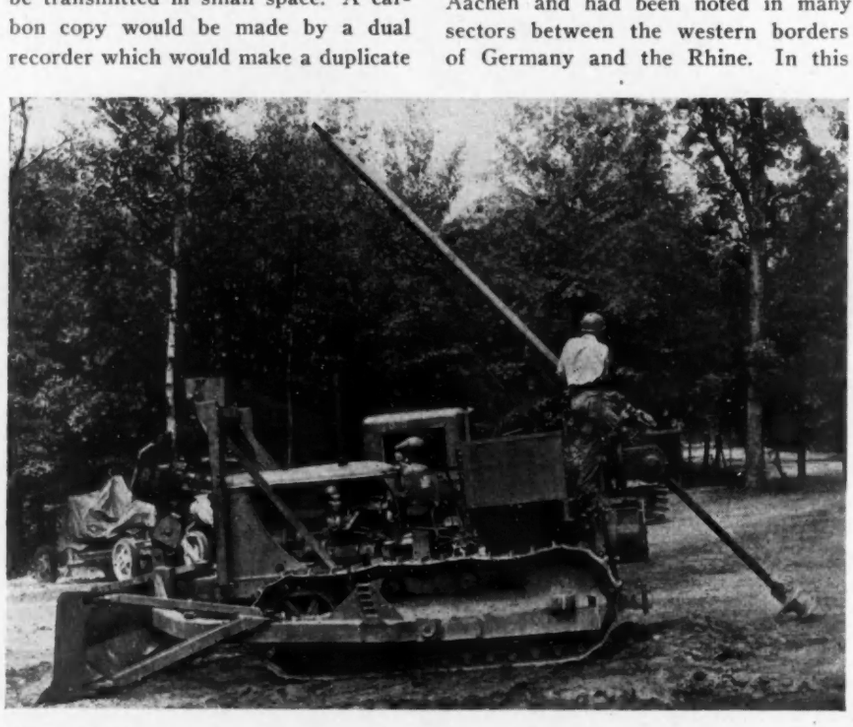
The development of wafer-thin plastic, small diameter records may result in a new type of letter communication. It has been stated that machines will soon be available which will permit business as well as social correspondence to be placed on these light weight inexpensive records which can be placed in special mailing envelopes and sent for a three cent stamp the same as a letter. Some of the primary advantages that have been advanced for "voice communication by mail" are: (1) the saving of stenographic expense, (2) the personal touch and (3) information that could be transmitted in small space. A carbon copy would be made by a dual recorder which would make a duplicate disc that could be filed in the same manner as a carbon copy of a letter. Thus it would appear that in the post-war world we may have two types of long distance voice communication, viz., voice via telephone wire line (two way) and voice via mailed records (one way).

Wire Planter—A Field Expedient

A simple but effective device known to signal troops as a "wire planter" was devised by Captain James D. Sink, Communications Officer, 116th Infantry Division, to meet an urgent need of protecting wire from frequent disruption caused by shell fragments in blind shelling by the enemy.

The need was keenly felt in connection with the fighting around Aachen and had been noted in many sectors between the western borders of Germany and the Rhine. In this area most of the strong points were in towns and the wire was laid along the open ground between these strong points. The open fields and gardens were usually not under observation by the enemy but were subject to almost continuous blind shelling whose object was to disrupt traffic and communications. Direct hits were rare, but shell fragments, nicknamed "grasscutters," flew about profusely, damaging the wires at many points and seriously hampering communications. It was found that even the heaviest fragments did not sink into the earth more than three or four inches, so it was decided that a trench six or eight inches deep would protect the wire from all but direct hits.

Captain Sink went to work on the problem on his own initiative and made a simple device that could be



When telephone poles are a rush-order job, the Signal corps now makes use of a new giant earth auger mounted on the rear of a bulldozer which digs 20-inch holes and plants poles in rapid succession. Lt. J. A. Burchard reports that with this gasoline-powered auger a two-man construction team can clear and level jungle sites preliminary to planting the 45-fool poles. The bulldozer is extremely mobile. It can be loaded on its huge trailer and transported practically with the ease of light equipment. Signal Corps photos

Pulling a telephone pole over to the hole that was dug with the giant earth auger.

Planting a pole by means of this new auger, developed by the Engineer Board.

improvised from salvage materials and yet accomplish its purpose in ordinary terrain. A sample was quickly built and it worked.

The improvised wire planter is merely a military adaptation of a field plow or a corn planter. A piece of one-inch pipe is bent up at one end and over this two steel plates are welded together in the shape of a V. A cutting edge is provided by shaping a third steel plate in the desired way and welding it directly in front of the V. The entire unit is then assembled and fastened to a reel cart. This cart is hooked to a small truck or larger cargo carrier, which furnishes the motive power, dragging the planter behind it like a corn cultivator. If the earth is hard-packed, some ballast is necessary to make the planter bite into it to the required depth. Usually the supervisor's body can serve it in that capacity. When hard roads are encountered, they must, of course, be cut by hand. When other wires, laid along the ground, are crossed at right angles, these must be lifted high to permit the passing of the planter.

Captain Sink's device is frankly a field expedient, but it has been widely used and has won enthusiastic praise for its effectiveness and simplicity. It will "plant" practically any type of wire used within a division, including cable up to ⅜ inch, although in the case of cable added labor is involved in removing and placing connectors. The trough or trench made by the planter is 1½ to 2 inches wide and provides no covering, as the earth is merely pressed to the sides instead of being overturned as by a plow. This permits ready access to the wire for purposes of troubleshooting and from a little distance the trench is almost completely invisible, especially when the grass has grown along the edges and when some of the earth has fallen back. Another very practical advantage in the field is that the wire planter is exceedingly simple in construction. Any signal unit can build one in a hurry from whatever scrap material is at hand.

Lighter Tools for Lineman

When one pound is lifted twelve inches, one foot-pound of energy has been expended. With this in mind it seems logical that the efficiency of a lineman could be increased by a reduction of weight in tools and equipment. If all the tools which a lineman must carry up the pole could be reduced in weight only five pounds, the energy saved on a 25-foot pole would be 100 foot-pounds for each trip. This is a subject at least worth looking into. Light weight alloys would ap-

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Each pole, after being carefully graded according to the physical specifications, is treated with eight pounds of creosote, or more if the customer desires.

COLFAX Creosoted Yellow Pine Poles will assure you the lowest annual pole cost obtainable.

For strength and economy, use
DIAMOND C
Creosoted Yellow Pine Poles

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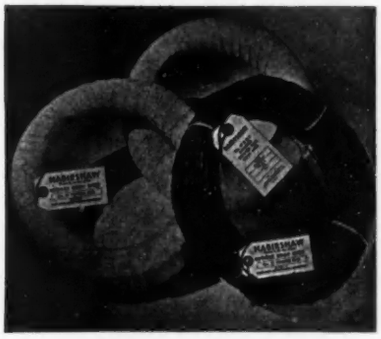

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High strength bronze conductor . . . expertly blended synthetic rubber insulation . . . soft, unbleached cotton braid, thoroughly saturated to provide a long-lived moisture-resisting covering.

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pear to offer a means of reducing tool and equipment weight. New light weight climbers have already been developed. Lighter weight telephone tools and equipment should have the end result of reducing the labor units required for various items of plant construction.

Television on Telephone Wires

A popular magazine recently announced that the Packard Manufacturing Corporation had developed a relatively simple method whereby television signals could be transmitted over standard telephone wires. According to the statement, high frequency television signals would not require expensive coaxial cable but could operate over ordinary cable and open wire. Details of this development were said to be a technical secret and were not divulged.

Television program material requires a frequency band several (usually six) million cycles wide as compared to 3,000 to 5,000 cycle band widths for ordinary telephone conversation material. Unless telephone circuits are especially equalized, the higher frequencies would be greatly attenuated if passed over telephone lines.

The idea of carrying television program material over telephone circuits is not new. It has already been demonstrated by the Bell System circuits that television programs can be successfully transmitted over ordinary telephone lines which are specially equalized. However, while equalization of ordinary lines for television frequencies is feasible on an experimental basis, it is not a satisfactory method for the general network distribution of television programs and for this purpose coaxial telephone cable is the best answer. At present there is much speculation as to the potential merit of the new development which would permit television to be transmitted over ordinary telephone wires.

New Patching Device

A new type of bullet-hole patching device which seals a tank punctured by gunfire in less than thirty seconds is saving thousands of gallons of vital fuel and water on American battlefronts.

Developed by engineers of the United States Rubber Company, working closely with Army Ordnance officers in Detroit, the device will plug holes ranging in size from one-half to four inches in diameter and is effective against damage by small arms ammunition and also larger shells up to 20 millimeter.

The device consists of a rubber ring of spongy synthetic rubber and a patented spring clamp. The soft rubber will deflect to any shape and will work on cylindrical or irregular surfaces. It is made of a special material to resist the deteriorating effects of oil and gasoline.

To install, one end of the clamp is inserted through the hole and two metal fingers open up to grip the inside of the tank, drawing the patch tight to the outside. The patch usually serves as a temporary seal and is removed when welding equipment is available to make permanent repairs.

Thumbnail Editorial

IN the prewar period many different types and makes of loud speaker intercommunication systems were on the market and being offered by radio shops to telephone business subscribers. Many telephone companies were approached by business houses wanting installations of loud speaking intercommunication equipment and were referred to the radio dealers on the theory that this was outside the baliwick of normal telephone operations and they wanted no part of it.

It is the opinion of your editor that the inter-communication needs of business houses should and can best be taken care of by telephone companies. Telephone companies have the men, the wiring material and the "know how" so why should they not furnish a service which is definitely in the realm of the telephone and not the radio field? Leading telephone supply houses are in position to furnish suitable units designed to be used either separately from or connected to the regular telephone system.

In many cases it will be found that extension telephones or small P.B.X. installations can provide a service far superior to that furnished by the inter-office loud speaker units which had such a popular prewar sale. However, if the telephone company is in position to offer either type of service they will be better able to sell the subscriber on the merits of telephone service for interoffice purposes as compared to the usual "push to talk" loud speaker installation. This is a subject that can stand serious consideration on the part of telephone executives.

15,000 Cycle Networks

One of the problems generated by the many new F. M. broadcasting stations which will dot the country after the war is how to distribute high quality programs on a network basis. Most F. M. stations will wish to transmit an audio band 15,000 cycles wide as compared to the present 5,000 cycle upper audio limit of most A. M. stations. If the F. M. stations are to be connected to the present wire networks which extend throughout the country and which make possible the network programs that are heard from A. M. stations, many of the wire networks must be modified to handle the larger frequency range. An alternate plan would be to tie the various F. M. stations on the same network together by means of radio relay networks. Because of the reliability and flexibility of wire networks it seems likely that this method will be chosen to handle the higher frequency requirements. Although a frequency band of only 3,000 cycles is required for normal telephone conversation, the telephone companies transmit frequencies as high as 150,000 cycles over some of their wire lines in connection with carrier telephone circuits by which a number of telephone channels are derived from the carrier current principle. This single problem again emphasizes some of the postwar problems that confront telephone men.

Standardization of Signal Corps Equipment Adopted by Navy And Marine Corps

The Signal Corps Standards Agency at Red Bank, N. J. has made an impressive record of success promulgating 39 standard specifications, which cover a wide variety of component parts and materials, and issuing well over 2,300 qualification approvals for items which have passed all the rigorous tests.

Basic features of this success have been the complete coordination between the Army and Navy, through the Signal Corps Standards Agency and the Bureau of Ships, and the active cooperation given by communications industries throughout the country. The Marine Corps also has adopted Signal Corps standardized nomenclature for its equipment.

The broad program of standardization has four chief aims: (1) interchangeability of items; (2) maintenance of required quality; (3) simplification and reduction in number of types; (4) establishment of grades and classes so that the better qualities may be used in the more critical applications.

LETTERS

from TELEPHONE ENGINEER readers

Dear Sir:

I am writing to you at this time with the request that you run a series of articles on Telephone Trucks in TELEPHONE ENGINEER. This is a subject that has been neglected or overlooked for a long time. It is also one in which there are innumerable improvements to be made.

Referring to your editorial, page 32 of the April issue, I wonder if you realize that most of the small companies mentioned have no power equipment at all for their rebuilding and that for the most part this construction will be hand labor.

The best telephone truck bodies that money can buy today are so obsolete that it is a shame that any telephone man would have to use them. The big line trucks are expensive and inefficient. They have degenerated into a combination derrick and carryall for freight and passengers. Only the large companies can afford them. As to their inefficiency, many times I have seen these big fellows with a crew of five out to replace a broken pole. It sits idle while the crew sink the hole by hand. With the five man crew the pole probably could be raised by hand quicker and just as easily as by using the derrick. On the other hand, we see the small fellow out with the crew of two, doing the whole job by hand. All of this is rather old fashioned when we look around and see the equipment the road builders and oil people have. The farmer is better equipped than most telephone companies.

At the present time I am in the Installation Department of Automatic Electric Company and have had the opportunity of talking with many telephone men in all parts of the country. Many of them now rely on home made bodies for their trucks. Practically none of the smaller companies use a pole derrick. All available models are too large and too heavy.

I expect to be with a small independent company within the next thirty or sixty days and will be in the market for a new truck as soon as they are available.

It is my belief that you can contribute a great deal to the telephone industry if you start the ball rolling on this subject. How about rounding up a few experts and having some new ideas presented?

Attached to this letter is an article with some ideas never before seen on any telephone truck.

Yours truly,
K. B. Sage,
704 S. Magnolia St.,
Palestine, Texas

Reader Sage presents his ideas for tomorrow's all purpose telephone truck on page 48. If you can contribute further suggestions, drop us a line.—Ed.

STROMBERG-CARLSON
Recommends...

COVERING THE GLOBE WITH ARMSTRONG'S
"Whitall Tatum" GLASS INSULATORS

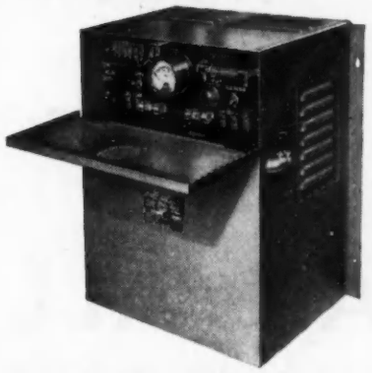
From the tropics to the northlands, Armstrong's "Whitall Tatum" glass insulators are giving trouble-free service. Meeting all A.S.A. and E.E.I. standards, they defy severe temperature changes.

Automatic machinery plus precise laboratory control guarantees uniformly high electrical and physical properties. Batch materials are rigidly checked. Ring-section studies assure uniformity of the glass while polariscope examinations certify that annealing has cancelled internal stresses and strains.

Crystal clarity of the glass reduces malicious breakage to a minimum. Careful gaging of the pin cavity results in a true, snug pin fit.

For samples and full information, write:

RAYTHEON RECTICHARGERS



FOR DEPENDABLE POWER IN UNATTENDED STATIONS

Because Raytheon RectiChargeRs keep batteries fully charged... are entirely automatic in operation . . . have no moving parts...and require no maintenance, they are ideal for unattended locations. Simply plug them into the AC input and connect the output to the batteries . . . adjust the charging rate . . . and from then on RectiChargeRs will—

- keep batteries fully charged
- prevent overcharge and undercharge
- eliminate voltage variations
- increase battery life as much as 40%
- reduce battery maintenance and inspection to once or twice yearly

Write for descriptive bulletin.

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Factory and General Offices: Rochester 3, New York, U.S.A.
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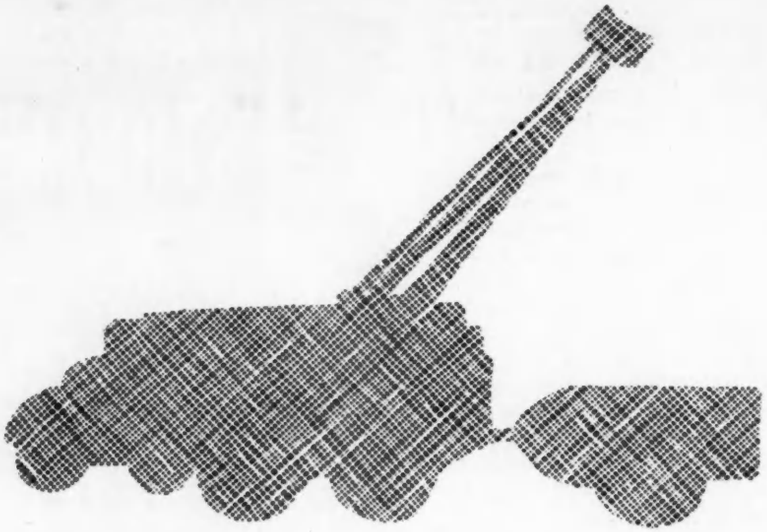
A TELEPHONE MAN suggests



AN ALL PURPOSE TRUCK

for the Small Telephone Company

By
KENNETH B. SAGE

ALL of us have heard recently of the new products and materials that will be available in the near future. Many of these will find their application in the telephone industry, and among them will be the telephone truck of the future.

The telephone truck of the future: an "All Purpose Truck," small, compact and powerful It will be capable of skipping from one job to another with an ease and purpose that will put its larger brothers to shame and be the envy of the small. It will be a specilized truck built especially for the small telephone company.

Since the "All Purpose Truck" is strictly a figment of the imagination and does not yet appear on the market, we will have to limit ourselves to a verbal picture and description. As we have nothing to compare with it, we must start from scratch. Likewise, we must have new ideas, some of which may part from established ideas and others which are radically different.

First, our truck is to be designed as a two man truck. It can be handled efficiently by one man and will find its place with the small company that normally has a crew numbering from one to four men. It will be used for calling on potential customers, service calls and minor repairs. We will use it for light construction. It will dig holes, set poles, take up wire and pull in cable.

We will operate from a fixed base, over an area not to exceed a 30 mile radius as this is typical of many rural communities. As the general trend in new construction is to move pole lines farther back from the highway, we will want a 4-wheel drive three-quarter ton chassis that will be capable of crawling in and out of ditches, through light brush, over knolls and hummocks and be able to operate on plowed or soft ground. For spring and fall we will have dual wheels on the rear. These may be placed on or off at will. There will be no running boards. Fenders will resemble those on present army vehicles. Streamlined fenders have no place on the work truck. They are ideal brush catchers and also we dislike working under them when mired or stuck in heavy snow.

BODY design in general appearance will retain the lines of the present day line truck, but will be smaller. Height will be fixed by that of the cab. The body will be of divided construction open in the center with compartments on either side. The compartments will have the added feature of removable plywood linings; lingings to be easily removable for the purpose of attaching leather strappings, hooks etc., for tools and equipment according to individual needs. Tool boxes with carrying handles and containing necessary installation tools, etc. can be easily taken out and replaced on sliding rollers similar to those in ladders and trimming tools, pikes, etc. The rear of the body will slope towards the cab.

This will give clearance for various attachments and also provide for two compartments opening from the rear. One will contain miscellaneous equipment, the other will cover winch controls. Provision will be made at the right rear for demountable wire reel. Covering for the open center section will probably disappear. There are several types that can be used, namely; the telescoping or sliding roof; panels dropped in place and dogged down, and third, a sliding canvas cover. The first

two are costly and may be jammed and placed out of commission, while the latter is short lived and subject to tearing. All three are subject to freezing in certain parts of the country. For purposes of economy and usefulness, a rear step and grab rail would be more appropriate.

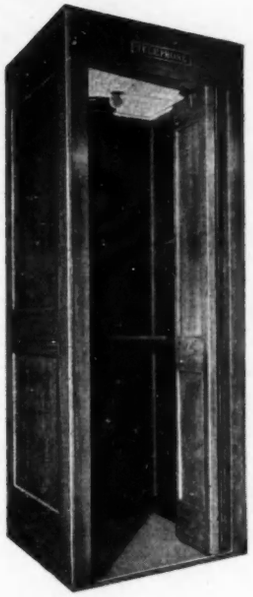
A warning light, preferably of the flashing variety similar to those in use on police cars will be located on top of the cab. It will flash front and rear with a swivel mounting for display from the sides when required. Headlights are used by a telephone truck usually in times of emergency, therefore they will be adapted to emergency use. The left light will be fixed on the road. The right will be normally located to bear low and to the right, flooding the ditch line. It will be equipped with handle and sufficient length of cord to enable it to be carried to the rear end of the truck and either placed on the ground or in mountings provided for that purpose. The cord may be on an automatic spool or for practical purposes be a plug-in extension of the locking type. Both headlights will have shatterproof lenses. An optional arrangement would have a flood light on the rear.

As we are operating from a fixed base, we are much like a farmer with a new tractor and attachments. We might well borrow an idea or two from him. He never works with plow, discs, cultivator or mowing bar attached at the same time. Neither does he use the tractor to haul his plow to the field and then harness the team to do the work. Therefore, our body will be designed for various attachments but will have no provision for carrying them with us all at the same time. Thus we will save a great deal of space and eliminate unnecessary weight.

ATTACHMENTS considered as necessary will include the following: winch, derrick, boring machine, power reel and trailer. The winch will be the one exception to our rule above and will be a peranent fixture. Our winch will not be a double drum giant capable of a 10,000 lb. pull on each drum and with an 800 ft. line capacity. It will be smaller and lighter with either a single or double drum type with 3000 to 5000 lb. pull and carrying from 200 to 300 ft. of line. It will be located at rear of cab. As we are not in the mood for playing hopscotch on the rear platform or jumping in and out of the cab, the controls will be conveniently located at the rear for one man operation.

STROMBERG-CARLSON RECOMMENDS...

The
CHURCHILL TELEPHONE BOOTH



Built to Last

The **CHURCHILL** No. 100 Folding Door Telephone Booth has structural features that give more rigidity and longer life.

It is constructed as a single unit and equipped with a reinforced back panel for mounting a wall telephone or coin collector.

The **CHURCHILL** Booth is made of selected white oak and is available in light or medium oak in a satin finish.

Included as standard equipment are electric light and automatic electric ventilator.

Overall height is 84¾"; width, 29"; depth, 30½". Shipped knocked down and crated.

Illustrated literature available.

SUB-CYCLE

"MASTER" RINGING CONVERTER

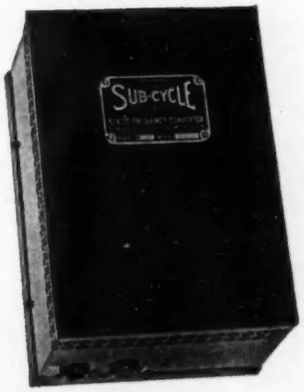
No Moving Parts . . . Nothing to Adjust

Sub-Cycle brings to the telephone field an exclusive development in an ***alternating current*** Power Ringing Converter which fully meets the requirements of operating companies.

It produces a powerful ringing current entirely independent of frequency variations in the commercial power supply.

Economical and quiet in operation, it does not interfere with radio and requires no routine maintenance.

Available in 6 models suitable for loads required by small P.B.X.'s or large central offices.



Output Capacities 7½ to 45 watts

STROMBERG CARLSON — PROGRESS IN TELEPHONY

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STROMBERG-CARLSON
RECOMMENDS—

Crapo
HIGH-TENSILE LINE WIRE

For Long-Span Low-Cost Lines

Construction costs are reduced to a new low level, maintenance expense is minimized, wherever **Crapo** HTL-85 and **Crapo** HTL-135 High-tensile, Low-resistance Line Wires are used. These revolutionary wires, with their superior strength, make possible rural lines with span lengths one and one-half to two and one-half times greater than were practical heretofore.

Crapo HTL-85 permits spans to 225 feet in heavy, 325 feet in medium, and 375 feet in light loading districts; provides stronger spans on existing pole structures.

Crapo HTL-135 makes possible spans of from 350 feet in heavy to 500 feet in light loading districts. Both wires possess superior telephonic transmission qualities.

Crapo HTL-85

Crapo HTL-135

Write for technical data!

FLIGHT OF TIME ... means nothing

HEMINGRAY NO. 10 — The exchange line pony with double groove. Standard on many telephone lines.

HEMINGRAY Insulators are made with scientific control of annealing, assuring great mechanical strength, no internal strains or stresses, giving long life with no deterioration.

HEMINGRAY'S tough Insulators will stand rough handling. Non-porous, they are impervious to moisture absorption. Clear and flawless, the Insulators are easy to inspect.

Long service plus initial low cost assure you of very small operating costs.

Insist on HEMINGRAYS
"FIRST IN GLASS"

STROMBERG PROGRESS IN TELEPHONY CARLSON

STROMBERG-CARLSON COMPANY
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The derrick will be light and smaller than those now accepted as standard. It will be designed to handle a load slightly larger than 2 or 3 men can lift by hand. Its capacity will be 1000 or 1100 lbs., which will allow for 25% for overload. We will depend on a pole jack for assistance in heavy work of pulling poles.

A BORING machine will be an attachment and will attract its share of attention. It may follow either one of two developments: The first, a two man portable auger; the second, a huskier trailer mounted type. The latter is preferable as being designed for use with our main unit and plans are all ready underway for its eventual appearance. It will resemble a gasoline powered model now on the market but will differ in the elimination of the power unit and method of trailer mounting. It is lighter in weight than present day models and can be quickly attached and detached by two men. The trailer unit is a husky U-shaped design hinged to the rear of the truck and resembles a wheel barrow being dragged in reverse. The weight is carried on dual rubber tires mounted close together on the caster principle. Power is supplied from power shaft at rear of main unit. Watch for the possible application of the hydraulic motor for this purpose. Also hydraulic operated derrick supports.

Power reel will remain about the same as those now in use, but will be carried only when plans call for its use. A possible development might call for the power reel to be used as a double for the demountable wire reel and thus eliminate the need for the latter.

The trailer completes our list of attachments and will be a dual purpose type of light weight construction using 16x6.00 tires. It will have a pole bunk mounted on the axle, no springs. Capacity will be about 6 light poles, three medium or two heavy respectively. An eight foot box with sides 8 to 12 inches high can be quickly attached with three fastenings, two at the bunk and one at the tongue.

This is my mental picture of our new truck. With attachments it approaches and can take over many of the duties now handled by the big fellows. We leave the attachments at home and we have a light unit. Through the proper planning and laying out of our work we are able to do away with much hand labor and lower our costs by the elimination of the "One Purpose" trucks most of us now have.

New Jersey Bell Operator Wins National Vail Medal

A Pitman, N. J., telephone operator, Mrs. Leonora H. Doble, has been awarded a silver Vail Medal and $500 in cash for saving the life of a woman through resourceful and effective use of telephone facilities.

In the 25 years since the Theodore N. Vail Memorial Fund was established in the name of the former president of the A.T.&T. Company, 1,227 awards have gone to telephone men and women for unusual acts and services in emergencies.

The new year, 1944, was just 20 minutes old and the rush of holiday traffic was at its height when Mrs. Doble answered a line signal on the Pitman switchboard. An excited man asked to be connected with a certain doctor. The doctor was not at home and the frantic man asked for the police. Sensing an emergency, Mrs. Doble monitored the call and learned that a woman in an isolated farm house was in an extremely critical condition, requiring immediate medical attention. The caller asked for an ambulance to take the woman to a hospital.

The police officer explained that an ambulance could not be sent without a doctor's order. At this point Mrs. Doble immediately offered to help. She first tried several local doctors without success. Then she called a neighboring town where other doctors were unsuccessfully sought. She made several more calls in search of aid, including one to a hospital where an ambulance was not available. Finally she appealed to the State Police. Through their intercession an ambulance was sent to take the stricken woman to a hospital at Camden. There, medical authorities said further delay would have proved fatal. The woman recovered.

"Mrs. Doble's resourcefulness and persistence in her efforts to summon medical aid were directly responsible for the saving of a woman's life," the Vail Medal citation said.

The New Jersey Bell Telephone Company was awarded a bronze plaque in commemoration of Mrs. Doble's achievement.

Rate Increase Approved

The Washington County Rural Telephone Company, Cottage Grove, Minnesota was authorized recently to increase its rates to assure a minimum return for its service to approximately 587 rural stations. The change represents a 50c increase per month with an increase on extension bells from 50c per year to 50c for four months.

STROMBERG-CARLSON
RECOMMENDS—

"DEPENDABLE" CROSS-ARMS

MADE BY:
American Cross-Arm, Inc.

The best quality cross-arms you can buy.

AVAILABLE IN:
- Douglas Fir
- Creosoted Yellow Pine
- Gulf-Red Cypress

For sturdy, well-seasoned cross-arms, specify "DEPENDABLE"

available for prompt shipment.

Your Cableman's Kit ---Is it Complete?

The DILLON TEMPEROMETER registers correct temperatures of Paraffin—Compounds—Wiping Solder—Impregnation Wax—Cable Damming Waxes.

Make sure the job is *perfect every time.* For best results, materials must be heated to specific temperatures. The DILLON TEMPEROMETER actually registers these temperatures for you—dial calibrated from 150° to 1000° F.

Special Features:
- Rugged and Compact
- 9" in length
- 5⅝" length of handle
- ¾" tube diameter
- 2⅛" dial diameter
- Laboratory and Field Tested
- Fully Guaranteed

AN UNBREAKABLE METAL THERMOMETER

STOP GUESSWORK IN HEATING CABLE MATERIALS

STROMBERG-CARLSON COMPANY
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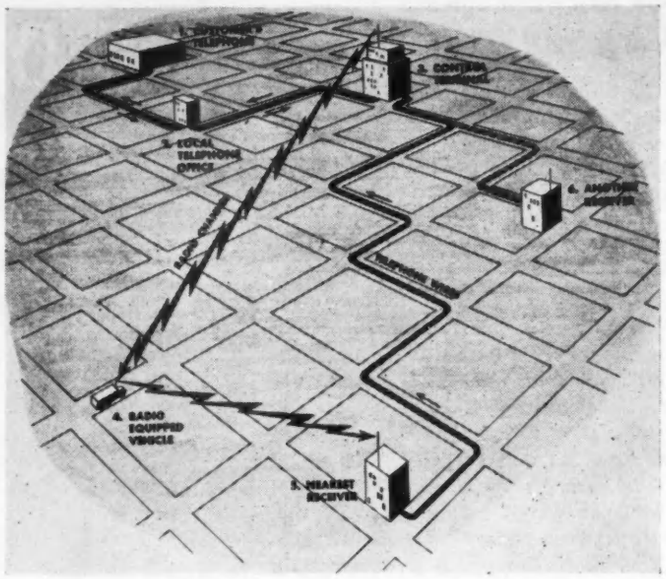
TELEPHONE SERVICE to AUTOMOBILES and MOBILE UNITS



Path of a typical call via the Bell System's proposed vehicular telephone service in cities: The customer (1) asks to be connected with mobile service. His call goes through the local telephone office (2) and on to the control terminal (3) where a special operator signals the vehicle he wants (4) by radio. The driver answers, his voice traveling by radio to the nearest receiver (5), thence by telephone wires, via the control terminal (3) and the local telephone office (2) to the customer's telephone (1). If the vehicle had been in the vicinity of another receiver (6) when called, the driver's answer would have traveled through the dotted telephone line to the control terminal (3). Large cities will be served by a number of these receivers to pick up the signals of the relatively low-powered sets on vehicles.

PLANS for a general mobile radiotelephone service which would bring the advantages of two-way voice communication to drivers of motor vehicles were announced June 29 by the American Telephone and Telegraph Company.

Applications have been filed with the Federal Communications Commission for authority to install radiotelephone stations in the following cities: Baltimore, Chicago, Cincinnati, Columbus, Denver, Houston, Milwaukee, New York, Philadelphia, Pittsburgh, St. Louis, Salt Lake City and Washington, D. C.

In addition, surveys are being made to determine the need for and the feasibility of mobile radiotelephone service in many other cities of the country, including Akron, Atlanta, Beaumont, Birmingham, Boston, Cleveland, Dallas, Dayton, Des Moines, Detroit, Forth Worth, Green Bay, Indianapolis, Kansas City, Little Rock, Los Angeles, Louisville, Memphis, Miami, Nashville, Newark, New Orleans, Oklahoma City, Portland, Ore., Providence, San Antonio, San Francisco, Seattle, Toledo, Tulsa and Wichita. The Bell System companies plan to make the new service available first in cities where public necessity is greatest.

Telephones on automobiles, trucks or other mobile units such as boats and barges will be connected with the general telephone system so that a subscriber to the general two-way mobile service can talk from an equipped vehicle to any one of the millions of telephones served directly by or connected with the Bell companies. Likewise, the occupant of an equipped vehicle can be called from any one of the millions of telephones.

In general, here's how mobile radiotelephone service is expected to work in cities:

Calls to and from motor vehicles will be handled by special operators. The conversation will travel part of the way by telephone wire and part of the way by radio. If a caller at his desk wants to talk to the occupant of a certain automobile, he first dials or asks for the vehicular operator. He gives her the call number or designation of the vehicle. She sends out a signal on the proper radio channel by dialing the code number assigned to that particular vehicle. An audible or visual signal indicates to the car occupant that he is wanted. He picks up his dashboard telephone and the conversation starts. Under his fingers as he holds the telephone handset is a "push-to-talk" button which permits him to switch from receiving to sending.

The operator of a mobile unit can originate calls merely by picking up his telephone and pushing the "talk" button. This signals the vehicular operator and she "comes in on the line." He gives her the telephone number he wants and the call goes through.

In large metropolitan centers it is probable that a number of fixed receiving stations will be employed, located throughout the area so that the relatively low-powered mobile radio sets will be within range at all times.

The receiver nearest to the mobile unit will pick up the voice signals and send them on their way by telephone wire. It is planned also to have more than one transmitter in order to give full coverage.

For years the Bell companies have furnished two-way radiotelephone service for coastal and harbor boats, ship-to-shore service for ocean-going vessels and also shipping on the Great Lakes and inland waterways. A limited two-way vehicular service has for some time been provided in New York

LENZ RECEIVER CORDS

LOOK FOR LENZ THIS MARK OF QUALITY

PERFORMANCE UNLIMITED

For 41 years LENZ have put Quality first in order to produce the best Telephone Cords, Wire and Cable possible.

LENZ engineering is responsible for new materials and improved manufacturing methods.

For instance: The study tinsel conductors of LENZ Receiver Cords protected by the finest moisture-proof insulation and extra strong outer braid assure longest possible service.

Write today for Cord Chart listing all types.

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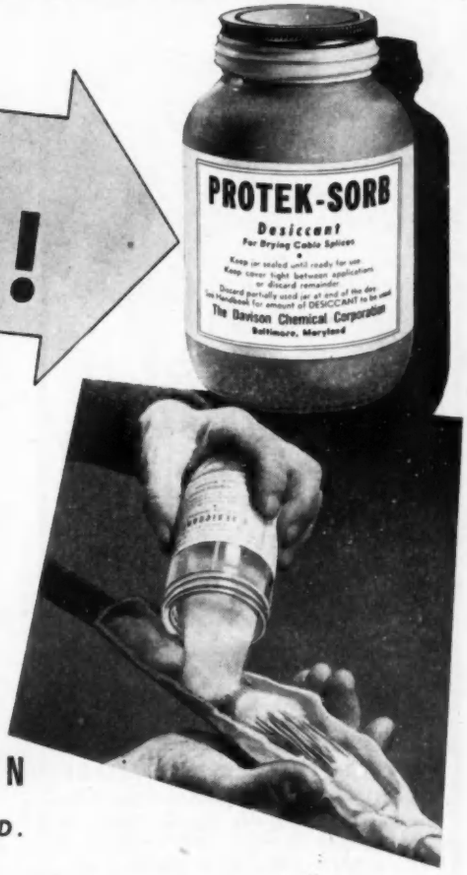
307 E. 3rd St.
Los Angeles 13, Calif.

LENZ ELECTRIC MANUFACTURING CO.

1751 N. WESTERN AVE., CHICAGO 47, ILL., U. S. A.

"IN BUSINESS SINCE 1904"

"TRAINED" TO LOOK FOR WATER!



Protek-Sorb* desiccant's specially-processed small mesh size gives it the ability to penetrate every nook and cranny of the open splice. It flows around the wires—gets in the smallest spaces . . . seeking out and adsorbing moisture. *No open space in the splice is too small for it to penetrate.*

Couple this with its extremely high capacity for moisture and there are your reasons why splices dried with Protek-Sorb desiccant are DRIED MORE COMPLETELY and DRIED FASTER. No wonder many leading telephone companies use and recommend Protek-Sorb desiccant.

Your regular telephone jobber stocks Protek-Sorb desiccant . . . *all you need to do is to ask for it.*

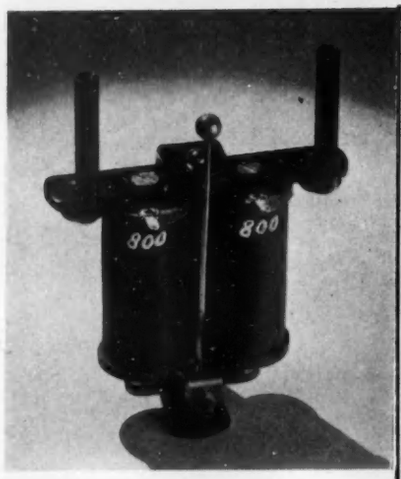
*Reg. U. S. Pat. Off.

THE DAVISON CHEMICAL CORPORATION

Progress through Chemistry

BALTIMORE-3, MD.

Canadian exclusive sales agents for PROTEK-SORB desiccant: CANADIAN INDUSTRIES LIMITED, General Chemicals Division



For Want of a Ringer
A Telephone May Be Out . .

If you don't have plenty of replacement ringers on hand better send in some old ones to Suttle for remanufacturing. That's the sensible thing to do.

DEPEND ON SUTTLE

Do More With Less Help!

SEYMOUR SMITH TELEPHONE PRUNERS

CUT FASTER, COVER MORE GROUND-Keen "Center-Cut" blade slices between two strong side supports. Branch is firmly gripped, quickly cut. Ask for prices.
SEYMOUR SMITH & SON, Inc.
901C Main St., Oakville, Conn.

and Boston for emergency use by certain public utilities companies.

Urban mobile service will operate as separate radiotelephone systems for each metropolitan area served. A metropolitan system will be arranged to serve not only cars, trucks, buses and harbor and river craft operating within the area, but also other mobile units such as trolley cars, tlevated trains and railway engines operating within the metropolitan area.

Preliminary surveys in a large number of cities indicate that mobile service will be used initially by business concerns or individuals operating vehicles or other mobile units within metropolitan areas where it is important that headquarters keep in touch with their various drivers or vice versa. The list includes:

Ambulance services, armored car service, burglar and fire alarm services, construction contractors, doctors, express companies, food distributors (meat packers, dairies, bakeries, etc.) newspapers, oil companies, pick-up and delivery services serving department stores and other retail establishments, public service companies (electric light and power, gas, water, steam, transportation and communication), refrigerator services, taxicab companies, trucking companies, boats in adjacent rivers and harbors, and railroad switch engines.

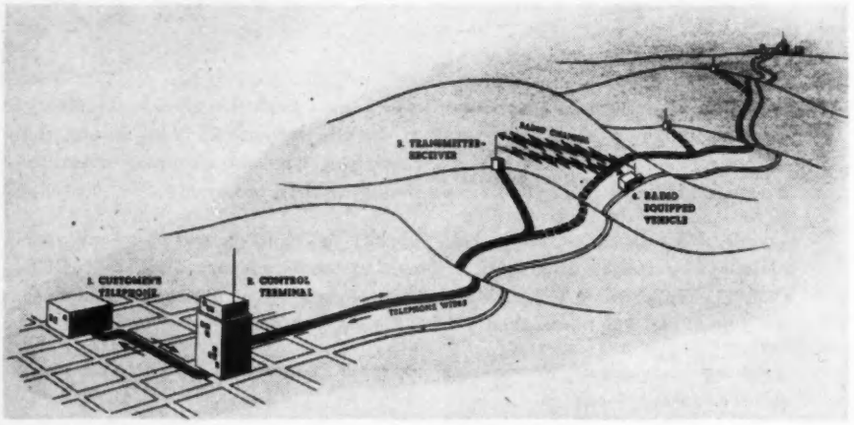
Three classes of mobile service are contemplated:

1. A general two-way telephone service between any regular telephone and any mobile unit, with a three minute initial period and the usual one-minute overtime period.
2. A special two-way dispatch service between a particular telephone at the dispatching office and specified mobile units. A direct line from the dispatcher to the telephone central office would be furnished as part of this service. A one-minute initial period and the usual one-minute overtime period would probably apply here.
3. A one-way signaling service to mobile units, to notify the operator of the unit that he should comply with some pre-arranged instruction, such as calling his office from the nearest public telephone.

Radio signals in the frequency range between 152 and 162 megacycles have been assigned for the urban mobile service. In general, transmission of these frequencies is greatly improved by mounting transmitting and receiving antennas on high buildings or on other commanding elevations.

The Bell System plan is to use transmitters of about 250-watt power in the metropolitan centers. The mobile units will have power of about 15 watts. Each mobile unit will use a single antenna for both sending and receiving.

Another type of mobile radiotelephone service which will be tried would furnish two-way voice communications to motor vehicles operating on intercity highways and to boats on adjacent waterways. This service would require transmitting and receiving stations along the highways to be served. The mobile units would be equipped for receiving and sending, and with signaling equipment similar to that to be used for urban service.



An artist's conception of how the Bell System's proposed two-way vehicular telephone service may work on the more important intercity highways in the postwar era. A customer (1) asks to be connected with mobile service. The special operator at the control terminal (2) routes the call over telephone wires to the transmitting-receiving station (3) which sends the signal on to the vehicle (4) by radio. A call originating at the vehicle would follow the same route in reverse. If the vehicle were beyond the range of the transmitter-receiver (3), the operator at the control terminal (2) would try the other transmitting-receiving stations farther down the highway until the driver answered the signal.

ADVANTAGES OF THERMOPLASTIC

There are fourteen practical advantages of theremoplastic insulation over older types of construction . . . advantages which PLASTIC engineering now makes possible at what, in most cases, is NO PRICE PREMIUM. Check them yourself: 1. Superior aging properties, 2. High resistance to oxidation, 3. Low moisture absorption, 4. High dielectric strength, 5. High tensile strength, 6. Resistance to flame, 7. Flexibility at low temperatures, 8. Resistance to abrasion, 9. Resistance to chemicals, 10. Resistance to oils and greases, 11. Ease of installation, 12. Increased capacity, 13. Attractive appearance, 14. Broad color range. Remember . . . when you're thinking of PLASTIC you're thinking of US!

Thermoplastic insulation specialists . . . producing a complete line from fine wires to heavy power cables . . . serving: Public Utilities, Radio, Electronic, Appliance and Instrument Manufacturers, Telephone Companies and Contractors.

PLASTIC

WIRE & CABLE NORWICH CONN

CORPORATION

Television and Telephone Companies

Recent demonstration of a new type television receiver by the R.C.A. Company to representatives of the press serves to emphasize the progress that has been made toward practical television on a nationwide scale. The principal advantage of the recently demonstrated television set is its substantially larger viewing screen. Previous systems have depended on a picture whose size is limited to that of the diameter of the cathode ray receiving tube. The new system makes use of a special spherical mirror and optical arrangement which projects the picture received on the cathode ray tube onto a special 16x21 inch plastic screen located in front of the television set.

The part which telephone companies will play in the postwar television setup is not yet clear. The Bell System has already shown that television program material can be successfully handled by the coaxial cable lines. The possible establishment of wide band telephone toll radio relay systems throughout the country would of course offer an alternative means by which television programs could be picked up and transmitted by telephone companies on a common carrier basis. One thing is certain: television will come of age within a very short time after the war ends and whether or not Independent telephones fit into the television picture remains to be seen.

YOU marvel as you watch a great shearing machine cut a heavy girder like a knife going through butter. Yet, there's even greater cutting power, in proportion to size, in a pair of Vacuum Grip Lineman Pliers.

The cutting blades of these super pliers are made of specially hardened alloy tool steel, hand-edged to the right angle for heavy duty cutting. After that they're set up in true alignment—and kept that way by strong non-wobble joint construction.

Wrap your fist around the long handles of a pair of Vacuum Grip Lineman Pliers. Insert a wire between the cutters. Apply light pressure and watch the results. Zowie! Is that CUTTING POWER? You'll say it is!

Forged Steel Products Division
SNAP-ON TOOLS CORPORATION
NEWPORT, PA.

Vacuum Grip Pliers

Kellogg Switchboard Engineer Returns from Overseas Duty

Colonel Norman H. Saunders, who recently returned to his position of consulting engineer at the Kellogg Switchboard and Supply Company after almost five years of administrative and combat activity in various war theatres, has recently been awarded the Legion of Merit in a military ceremony at Fort Sheridan. Colonel Saunders was decorated for meritorious service in battles in North Africa, Italy and Southern France.

Back to civilian life, Mr. Saunders returns to the telephone field where he had been actively engaged for over 20 years. He is well-known in the Independent telephone industry through his many years of engineering work and the numerous technical articles he has written on various phases of dial switching equipment. For several years, Mr. Saunders was an instructor in machine switching circuits. He has specialized in relay switching equipment for telephone central offices. His broad experience in this work is being

Col. N. H. Saunders

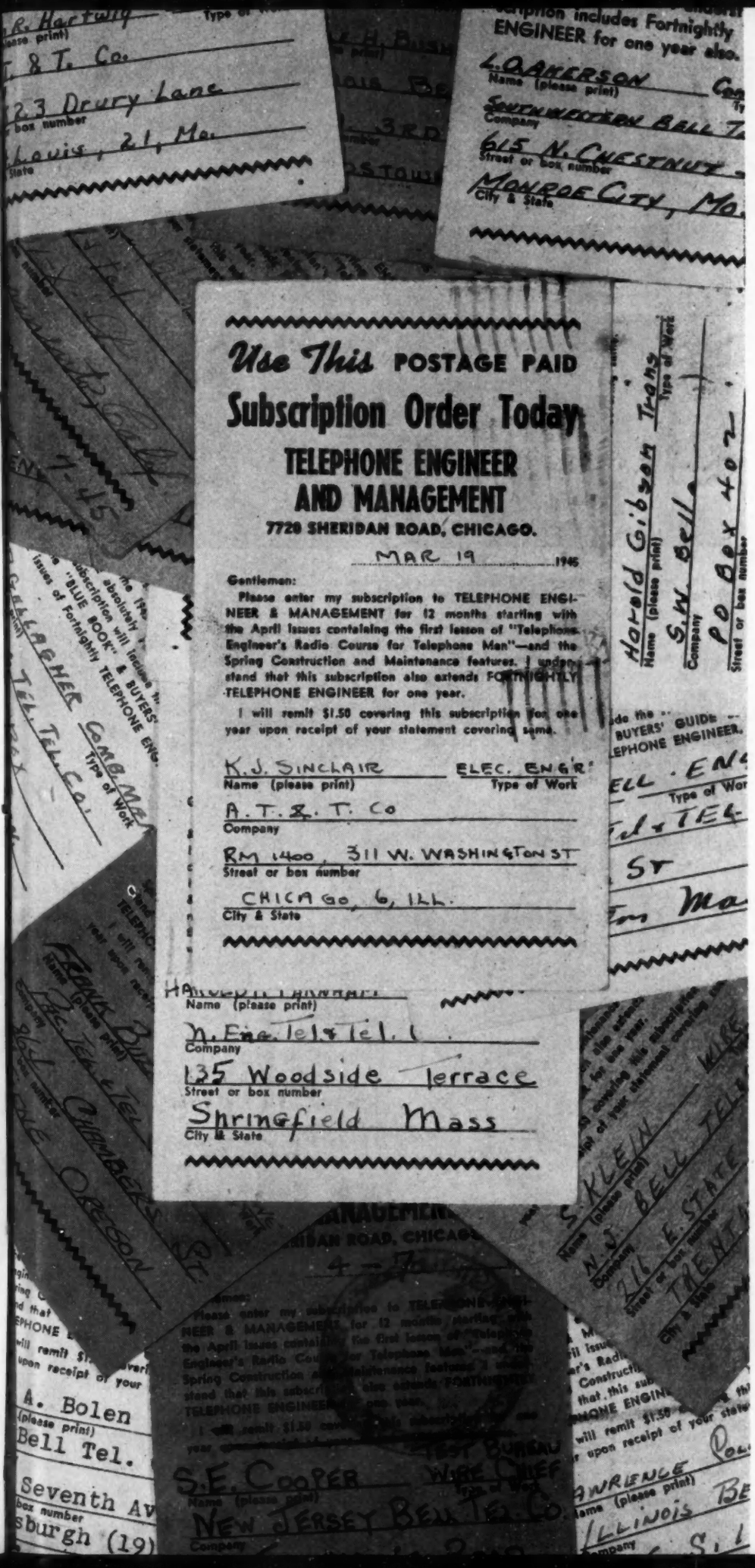
devoted to the improvement of operating practices and subscriber services for Kellogg customers.

Rates Increased

The Barton (N. D.) Telephone Company is increasing its rates on business telephones from $1.25 to $1.50 and on resident phones from $1.00 to $2.00 per month in accordance with the state commission's authorization.

Police Catch Thief Through Phone Operator

When a gas station signal showed on her board and nobody answered at 2:55 A. M., Mrs. Ruth Ewing, night supervisor at Middle States Tel. Co., Park Ridge, Illinois, notified the police and they caught the thief. He had pulled the phone from the wall and smashed the coin box with a hammer.



No. 3 of a Series

The PROOF *of Reader appeal is in the* PAID *Subscription Response*

★

Purchasers of advertising, familiar with TELEPHONE ENGINEER & MANAGEMENT's popularity among Independent telephone men, often ask the question "How about your Bell Company circulation?"

Our answer—

TELEPHONE ENGINEER and MANAGEMENT has for many years enjoyed the LARGEST CIRCULATION of any *paid subscription* trade journal among managers, engineers and maintenance men of the telephone industry.

★

Yes — We mean the whole telephone industry—both Independent and Bell.

. . . and TELEPHONE ENGINEER & MANAGEMENT's popularity among Bell men continues to grow just as it has among Independent telephone men, railroad communications men, and men in charge of communications of many industrial firms.

Pictured are a few new subscribers from Bell company men

Watch August TELEPHONE ENGINEER & MANAGEMENT for more information regarding readers of its columns.

East Central Group of General Telephone Corp. Meet in Indiana

THE Boards of Directors of Indiana Associated Telephone Corporation, Lexington Telephone Company, and Michigan Associated Telephone Company, together with several of the officers and directors of General Telephone Corporation as their guests, made a tour of inspection of the newly remodeled headquarters' offices of the East Central Group of General Telephone System located at 661 Main Street, Lafayette, Indiana, on the evening of June 19, 1945, and held a joint meeting of the Boards on the following day June 20, 1945.

At the directors' meeting in Lafayette, Indiana. Standing L to R: Louis E. Legg, Harry P. Karnes, Carl R. Willis, Barckley A. Storey, Ray T. Kieren, Ernest H. Schilling, Henry R. Christianson, George D. Freeman, Luverne E. Armfield, Fred Bryant, Louis O. Evenson, John C. Nichols, George A. Graffis, Frank O. Cuppy, Clarence D. D'Aoust, C. N. Sessions, William C. Meinke. Seated L to R: Burton W. Saunders, Edwin M. Blakeslee, G. Herbert Semler, Robert A. Gantt, Harold V. Bozell, Pearson Winslow, Thomas A. Boyd and Judge George R. Hunt.

The New York guests were Harold V. Bozell and Thomas A. Boyd, president and vice-president, respectively, of General Telephone Comporation; Robert A. Gantt, G. Herbert Semler and Pearson Winslow, directors of General Telephone Corporation.

One of the highlights of the two-day meeting was the luncheon given at noon on the second day in Lafayette where there was displayed and later served to the 28 present, a 30 pound baked Atlantic salmon, the gift of Russell B. Stearns, president of the National Food Products Corporation and a member of the Board of Directors of General Telephone Corporation. The salmon was caught by Mr. Stearns in the Moisie River in Quebec, Canada, and shipped to Lafayette especially for the occasion.

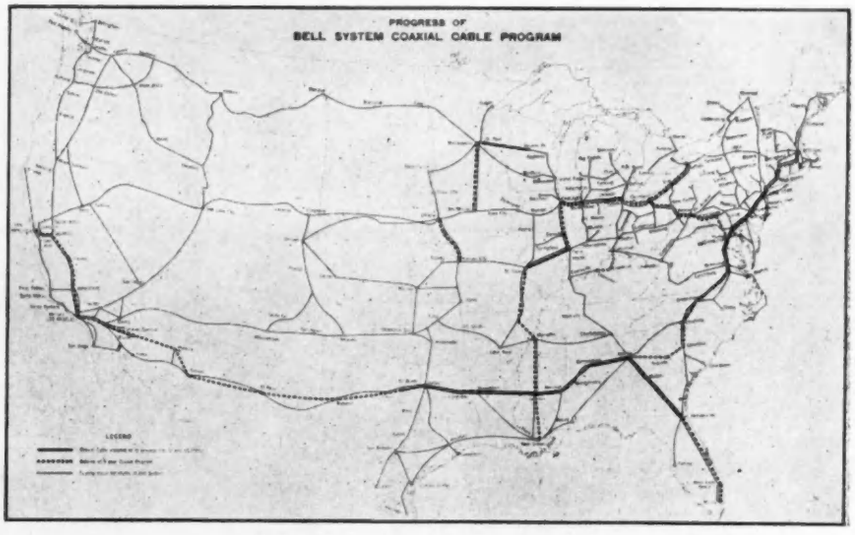
The Board meetings were followed by a session designed to have the directors become better acquainted with staff members and at which meeting each department head demonstrated some of the more important functions and purposes of his department.

A.T.&T. Coaxial Cable Progress

THE Bell System expects to have 2,000 miles of its coaxial cable network manufactured and at least three-fourth of this mileage in the ground by December.

One year ago the American Telephone and Telegraph Company announced a 5-year coaxial cable program involving 6,000 to 7,000 route miles of construction. The job is going forward rapidly because of the steadily increasing need for more telephone circuits between the nation's far-flung war centers.

In addition to its use for long distance telephone service, coaxial cable is capable of transmitting the frequencies required for television. The coaxial cable system now being built is therefore suitable to form the backbone of future nationwide television program networks.



Progress of Bell's coaxial cable program throughout the country is illustrated with a heavy dark line for coaxial cable installed or in process of being installed. The dotted lines indicate balance of the 5-year program, and the fine lines indicate existing major toll routes.

Frank B. Warren Dies

Frank B. Warren, 49, general counsel of RCA Communications, Inc., died at 10 a. m. June 25 at New York Hospital after an illness of almost a year's duration.

Mr. Warren joined RCA Communications as general counsel on April 2, 1943, after a long career with state and Federal regulatory commissions dating back to 1919. At the time of his appointment to the RCAC post, he had served for a year as assistant general solicitor of the National Association of Railroad and Utilities Commissioners. He had previously served from 1936 to 1942 as principal attorney in the Common Carrier Division of the FCC and during part of his career with the Commission he was in charge of all telephone cases for the FCC Law Department. The NARUC published a tribute to Mr. Warren June 26.

Mr. Warren was very well liked at the FCC and in State Commission circles and was well known in many branches of the communications industry.

Sales Authorized

The North Dakota Public Service Commission has authorized the Dakota Automatic Telephone Company of Fargo to buy the telephone properties of the Home Improvement Company of Crystal, N. D.

Sale of the telephone properties of Sawyer, N. D., has also been authorized: L. H. Finneseth to sell and August Faul to buy.

Negotiate to Buy Company

H. B. Crandall of Princeton, Illinois headed a group of telephone engineers and with E. E. Patterson of Chicago inspected the holdings of the Red River Valley Telephone Company, Northwood, N. D., which had been operating for 40 years in nine nearby towns. They are offering to purchase all outstanding stock at a premium.

The new owners would continue under the same name and setup, however modernizing their instruments installing automatic exchanges, and in order to meet the problems of rural electrification soon to arise, feel it would be necessary to metalize the system. The modernization and improvement program would be ready to be put into effect as soon as material is available, and the estimated cost of these improvements would be $250,000. They do not expect to realize any profits from their investment until five years or so.

POWER

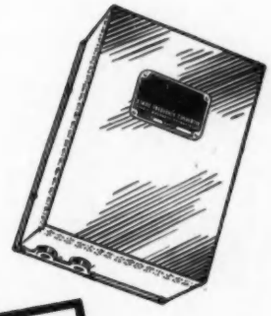
TO KEEP YOUR CIRCUITS WORKING

Here are some of the power-supply items Graybar offers to help assure trouble-free operation of your plant. Complete information about these and hundreds of other first-quality telephone supplies is available from the Graybar Telephone Specialist near you. You'll find him conversant with your requirements and able to provide the best available supplies for all your maintenance and essential construction needs. *Graybar Electric Company, Graybar Building, New York 17, N. Y.*

STORAGE BATTERIES – Via Graybar, you can get Exide and Philco storage batteries in many types and sizes designed specifically for telephone service.

BATTERY CHARGERS – Graybar distributes copper-oxide, selenium, and tungar battery chargers – products of General Electric and Raytheon.

DRY CELLS – Graybar supplies Eveready Columbia dry cells—the long-lived cells for local battery service.



RINGING MACHINES – Graybar offers Holtzer-Cabot, Leich, Lorain Sub-Cycle, and Telering ringing machines – including Holtzer-Cabot and Leich machines for harmonic ringing.

via GraybaR
First Source of Telephone Supplies

4384

IN OVER 80 PRINCIPAL CITIES

Major General Colton Visitor at Hallicrafters

Major General Roger B. Colton, Air Communications Officer, Air Technical Service Command, Wright Field, was an official observer on the production scene at the Hallicrafters Company, Chicago, recently.

Gen. Colton expressed his satisfaction with the continued vigor with which the company's production of short-wave radio war equipment is being handled.

The expanded operations against the Japanese have been reflected during recent months in an upsurge in Hallicrafters production of air borne radio equipment.

Major General Roger B. Colton, Air Communications Officer, Air Technical Service Command, Wright Field, (Center) during a recent official visit to the Hallicrafters Company, Chicago. Conferring with him are (right) William J. Halligan, Hallicrafters president, and Robert E. Samuelson, Chief engineer.

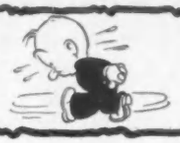
Gray Manufacturing Creates War Memorial

In the first such move reported in American industry, The Gray Manufacturing Company, Hartford, Conn., announced recently the creation of a memorial to former employees who died in this war, to take the form of employee scholarships for the study of music at the Julius Hartt Musical Foundation.

Competitive auditions will be held in the plant and winners will be given instructions in their normal leisure hours. Should the three awards scheduled for this year not be filled by employees, the competition will be opened to children of Gray workers.

Walter E. Ditmars, president of the concern, stated that "various employee activities have amply demonstrated that talent exists among Gray workers. Proper development of this talent is the opportunity opened by this memorial." Considerable employee interest was evidenced when the announcement was made at the company, which produces pay telephone stations and wartime electronic devices.

DO YOU KNOW



Pigth Ith Pigth

A cub reporter who took an item over the telephone wrote about a farmer's loss of 2,025 pigs by theft. "That's a lotta pigs," thought the editor, so he personally called the farmer and asked: "Did you lose 2,025 pigs?" The farmer answered, "Yeth." The alert editor thanked him and changed the story to read: "Two sows and 25 pigs."

✦

Natives of the South Sea Islands attribute weird magic powers to members of the U. S. Army Signal Corps using walkie-talkie field radio sets, enabling them to talk to "iron birds high in the sky."

✦

On the basis of comparable figures, the number of Bell System telephones has more than doubled in the last 20 years, while the volume of long distance messages has increased sevenfold.

✦

An Akron, O., business man, in telephoning New York, was considerably startled when an operator broke in at the end of five minutes and murmured politely, "Your time has come, please."

✦

Not Incorporated, But Furnished Good Service

Nestled close to an airfield on Iwo Jima is a communications center manned by Marines who were sniped at and shelled for four long days and nights. Shortly after they set up the center, they took time out to set up a large sign in plain view of Japs nestled on nearby Mount Suribachi, the bristling fortress crest which finally fell.

The sign read: "Iwo Jima Telephone Company."

The exchange names were of course, secret, but the Marine telephone crew insisted that it was a permanent exchange and that telephones would NOT be removed at the order of the silence-minded Jap inhabitants of the island.

Robert Lissel, Blue network correspondent, reports he didn't believe you could go more than a half mile along the front without seeing telephone men at work.

✦

A few examples of how the Bell Telephone System is conserving material for the war effort are its annual use of aluminum has been reduced from 1,000 tons to 70, zinc has dropped from 7,500 tons to 1,000, rubber has been cut from 1,900 long tons to 200, and use of tin has been cut from 980 tons to 130.

✦

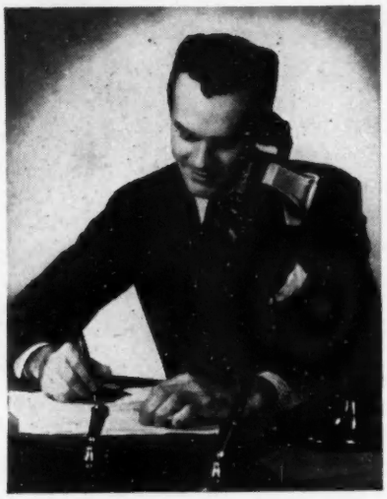
American soldiers in Australia find many differences in the telephone vocabulary there and at home, with Australians calling a teletype switchboard a "concentrator," operator a "telephonist," extension a "parallel," installer a "mechanic," long distance a "trunk call" and our "hello" is "are you there?"

✦

A man's best friend may be a dog in the U. S. A. but in the South Pacific, the best friend a telephone man can have is an elephant. It is up to the elephant to maneuver the poles where they are wanted; he eliminates spurs by simply kneeling for his human cargo, and safety belts aren't needed because he presents a high, steady platform for the job of stringing the wire. He won't get stuck in the swamp as would a truck, nor need he detour around underbrush. But perhaps his most valuable asset is the fact that he is already there and need not be shipped thousands of miles along with fuel and repair parts to keep him going. But can you picture him as a company "mascot"?

✦

Guam, which had 500 Magneto telephones before the war, is getting a modern telephone system, the work being the first in a project which will put similar systems on several other Pacific islands.



The "PHONE EASE"

holds the telephone in proper position—freeing both hands for use—

NOW it is easy to write orders, light your smokes, hold your books, thumb thru files, doodle or do any number of things without interrupting telephone conversation. Simply snap this handy servant to your receiver and it is ready for use. Nothing to get out of fix—works equally well on either right or left shoulder. Order yours today . . . $1.50 each.

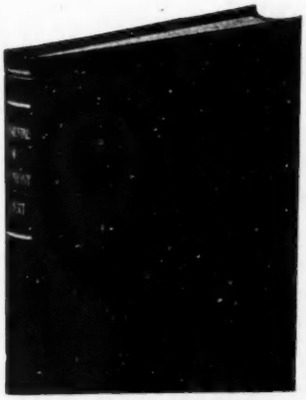
Send orders with remittance to

TELEPHONE ENGINEER Book Corp.

7720 Sheridan Road ***Chicago 26, Illinois***

A Simple, Up-to-the-minute Guide to Telephone Fundamentals

to give you the groundwork you need for best results in practical work



This first new telephone book in years tells how modern telephone systems operate, giving the electrical theory and the technical information on equipment and circuits that will be most helpful as a foundation for the non-engineering worker in telephone installing, servicing, etc.

Just Published

FUNDAMENTALS OF TELEPHONY

374 pages, 5½ x 8½, 200 illustrations, $3.25

This book provides the telephone worker with an understandable treatment of the technical aspects of his work, valuable as a key to better results and improved skill in any job he may undertake. The fundamentals of electricity and acoustics are covered, followed by a full elementary treatment of telephone equipment and circuits, their elements, characteristics, functions, etc., illustrated by many numerical examples.

Order direct from

TELEPHONE ENGINEER BOOK CORPORATION

7720 Sheridan Road ***Chicago 26, Illinois***

To avoid delay please send remittance with order.

You can make better pair splices . . . faster

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The National Telephone Supply Company

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Canadian Mfr —

N. SLATER CO., LTD., HAMILTON, ONTARIO, CANADA

Export Distributor: INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

Figures of speech

When the telephone industry adds up its wartime job in terms of telephones and electronic equipment supplied to the armed forces, the figures run into the millions. They help explain better than words why there are civilian shortages here at home.

The advertisement shown on the opposite page aims to give the public the facts. Appearing in national magazines during July, it is one of a series of such informative messages to the American people.

An advertisement of the Bell Telephone System

AMERICAN MORTAR CREW IN ACTION ON PACIFIC BATTLEFRONT. SOLDIER AT LEFT IS GETTING TELEPHONE REPORTS FROM AN OBSERVER.

Millions of Military Telephones

In the last five years the Bell System has furnished millions of telephones for war, including 1,325,000 head sets for air and ground forces and more than 1,500,000 microphones. . . . Also more than 1,000,000 airplane radio transmitters and receivers . . . 4,000,000 miles of telephone wire in cables . . . a vast quantity of switchboards, gun directors and secret combat equipment. That helps to explain why we are short of all kinds of telephone facilities here at home.

BELL TELEPHONE SYSTEM

Radio Course For Telephone Men

(Continued from page 31)

Effect of Inductance and Capacitance Ratio Tuning

IN addition to the above factors the ratio of the inductance value to the capacitance value has some effect on the selectivity of a tuned circuit. In a series resonance circuit, for example, it is desirable that a relatively high value of inductance be used and a low value of capacity for maximum selectivity. The opposite is true in a parallel tuned circuit. The selectivity of the tuned parallel circuit decreases as the ratio of capacity to inductance increases, i.e., the larger the capacity as compared to the inductance, the better the selectivity.

Sharpness of resonance in a series circuit can be expressed in terms of a ratio, namely:

$$\text{Sharpness of Resonance} = \frac{L\omega}{R} = \frac{I}{R\omega C}$$

Where: C = capacity at resonance, L = inductance at resonance, R = resistance of the circuit, $\omega = 2\lambda$ times the frequency.

It will be noted that the sharpness of resonance is increased by lowering the value of either the resistance or the capacity. Practical considerations prevent the circuit designer from using exceptionally high values of inductance and low values of capacity. The difference in the requirements for a series and parallel tuned circuit with respect to the L-C ratio is pictured in Fig. 50.

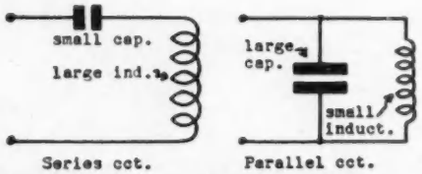


Fig. 50—Effect of inductance—capacitance ratio on tuned circuit selectivity.

The "Q" Factor of Coils

THE resistance in a tuned circuit generally occurs in the coil rather than in the condenser, hence engineers responsible for radio circuit design are constantly striving to improve their coils. A term that is used to express the quality of an inductance from the standpoint of its selectivity characteristics is the "Q factor of a coil." This factor can be expressed by the following equation:

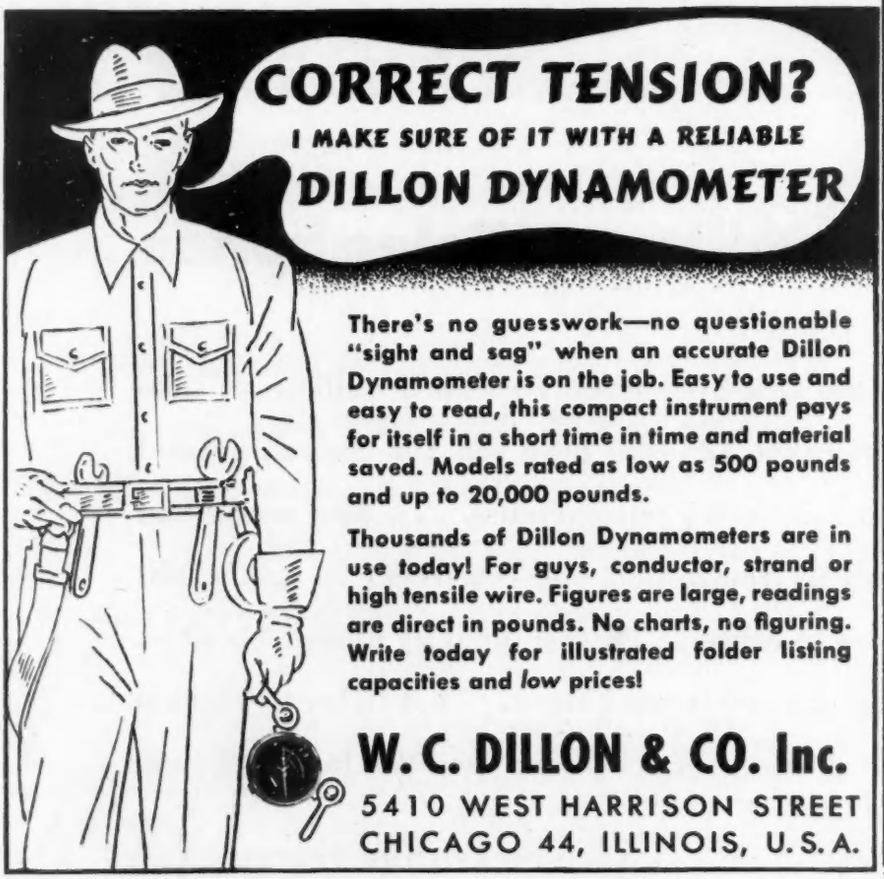
$$Q = \frac{L\omega}{R}$$

It will be seen that the "Q" value of a coil varies with frequency and tends to fall off as the frequency is increased, because of the increased resistance losses due to greater dielectric and skin effects at the high frequencies. The "Q" of coils varies from 50 up to several hundred. The higher the numerical value, the better the selectivity characteristics of the coil.

(Part 1 of Chapter 5, will appear in the August 1 FORTNIGHTLY TELEPHONE ENGINEER.)

Examination Questions
Chapter 4—Basic Theory of Tuned Circuits

1—Name the two basic types of tuned circuits.
2—When a series resonant circuit is tuned to a critical frequency, does it offer minimum or maximum impedance to the A. C. current flowing in the circuit?
3—What is the basic equation for series resonance?
4—At what frequency would a 2 m. f. condenser and 2 henry inductance be resonant?
5—Draw two schematics, one showing the series resonant type of circuit and the other the parallel resonant type.
6—What effect does resistance have on the current flowing in a series resonant circuit?
7—Does inductive or capacitative reactance predominate in a tuned circuit at resonance?
8—Explain the difference between a high pass and a low pass resonant filter.
9—Does the selectivity of a resonant parallel circuit decrease or increase as the ratio of capacitance to inductance increases?
10—Explain what is meant by the "Q of a coil."


CORRECT TENSION?
I MAKE SURE OF IT WITH A RELIABLE
DILLON DYNAMOMETER
There's no guesswork—no questionable "sight and sag" when an accurate Dillon Dynamometer is on the job. Easy to use and easy to read, this compact instrument pays for itself in a short time in time and material saved. Models rated as low as 500 pounds and up to 20,000 pounds.
Thousands of Dillon Dynamometers are in use today! For guys, conductor, strand or high tensile wire. Figures are large, readings are direct in pounds. No charts, no figuring. Write today for illustrated folder listing capacities and low prices!
W. C. DILLON & CO. Inc.
5410 WEST HARRISON STREET
CHICAGO 44, ILLINOIS, U. S. A.

Veteran Employees Club At Kellogg Switchboard & Supply

Employees of the Kellogg Switchboard & Supply Company having fifteen or more years of service, completed organizational plans at a dinner and business meeting recently. Of the 248 employees who were eligible to join the Veteran Employees Club, 242 members have already enrolled.

Officers of the newly formed Kellogg Veteran Employees' Club; Seated L to R: John Shannon, vice-president; John Geiger, pres.; Phillip Vetter, treas.; John Shaver, sec. Standing L. to R: Emanual McAvoy, auditor; Walter Fulle, director; James Reichman, auditor; Jess Anksorus, George Peterson, Edward Killoren and Art Gabel, directors.

The Kellogg Switchboard & Supply Company is a leading engineering organization and manufacturer of telephone systems, radio apparatus and industrial electrical equipment and the long experience of its elder employees is of particular value to the company due to the technical nature of its business and operations.

Distributes Pamphlet on "The Telephone Way"

An excellent pamphlet, explaining the rules and policies of the company, employment opportunities and wage policies, the benefits and pension plan and the responsibilities of employees, has just been distributed to its personnel by the Pennsylvania Telephone Corporation of Erie, Pa. A foreward to the pamphlet was signed by President Harry M. Engh.

Retired District Manager Dies

Walter C. Cooper, 72, retired district manager for the Lincoln (Nebr.) Telephone & Telegraph Company at Hastings, died at his home on June 19 following an eight months' illness.

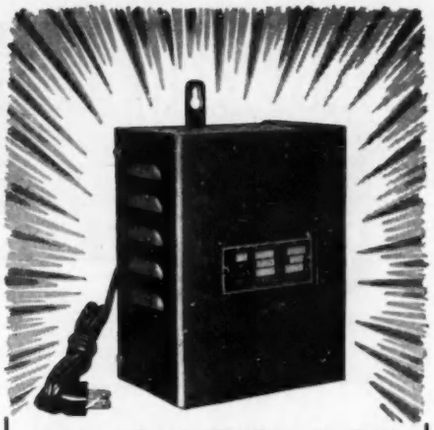
A veteran telephone man, Mr. Cooper began his career 58 years ago with the Missouri and Kansas Telephone Company at Arkansas City, Kansas. He later was connected with telephone companies at Winfield, Ottawa and Wichita, Kansas, and Guthrie, Oklahoma, before moving to Hebron, Nebraska. He became manager of the Lincoln Telephone & Telegraph Company at Hebron in 1912 and served two terms as mayor from 1913 to 1915.

Moving to Hastings in 1915, he was appointed local manager for The Lincoln Telephone & Telegraph Company and in 1916 was promoted to district commercial manager. In 1922, he was made district manager and retired from active service on July 1, 1928.

He held life membership in the Frank H. Woods Chapter of the Independent Pioneer Telephone Association and the Telephone Pioneers of America.

Ceiling Price on Lodge Poles

A dollar and cent ceiling price was set for non-pressure preservative butt treating and framing of lodge pole pine poles, the Office of Price Administration announced recently. These lodge poles which are commonly used for telephone and telegraph service have previously been out of price control reaches. The ceiling became effective June 18 and resulting prices for non-pressure treated lodge pole pine poles are in line with maximum prices established for butt treated poles of other species.



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GIVES WORRY-FREE SERVICE

Operates direct from lighting circuit. Delivers constant, humless D.C. to operator's circuit on magneto switchboard. Power-off relay assures uninterrupted service in case of power failure. Low in cost! See your jobber, or write direct for full information.

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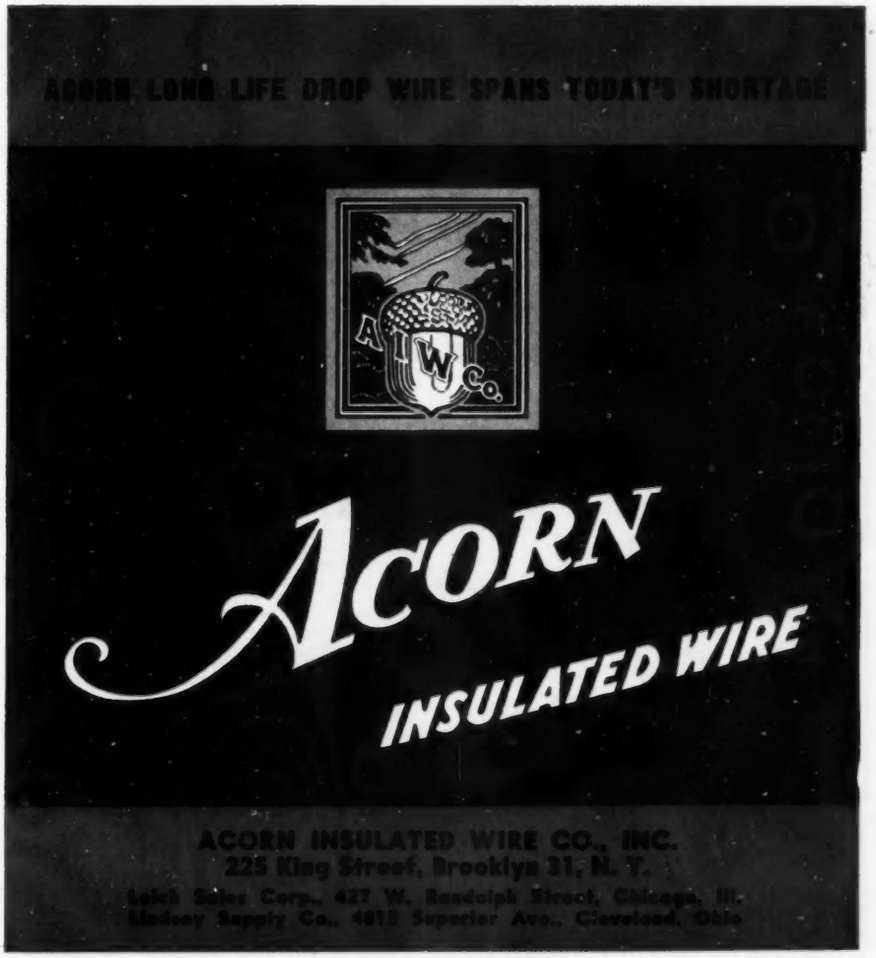
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INSULATED WIRE
ACORN INSULATED WIRE CO., INC.
225 King Street, Brooklyn 31, N. Y.
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SUB-CYCLE

. . . changes commercial power into a powerful, dependable ringing current. Gives years of trouble-free service.

- No Moving Parts
- Quiet Operation
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- Nothing to Adjust

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SYNTRON
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PAVING BREAKERS

100% Self-Contained
No Air Compressor and Hose
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927 Lexington Homer City, Pa.

Telephone Engineer
HANDBOOK TABLES

Subject—Wire Clearances (Continued) **Index—Outside Plant Design**
Date—July 15, 1945

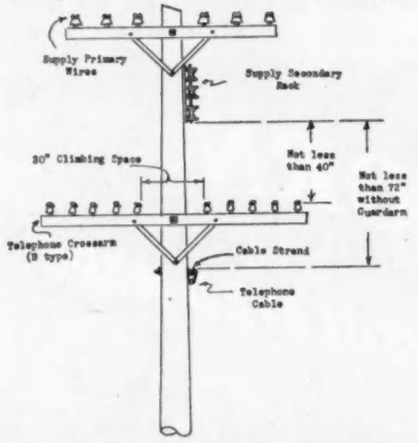

Figure 3—Minimum vertical clearances and climbing space on jointly-used pole with supply open wire and telephone open wire and cable.

Note 1—If transformer or its hanger is less than 1" from the crossarm brace, minimum clearance is measured from the lowest point of the brace. (For Figure 4.)

TABLE NO.9

CLEARANCE of VERTICAL and LATERAL CONDUCTORS from other WIRES and SURFACES on the SAME SUPPORT

Vertical and Lateral Telephone Conductors	Amount of Clearance
On telephone poles or within the telephone space on jointly-used poles:	
1. Clearances and separations from other conductors (except those in the same ring run) and from guy, span, or messenger wires.	3"
2. Vertical clearance from any supply conductors (other than vertical runs or long leads) of 8700 volts or less between conductors.	40"
3. Vertical clearance from any supply conductors of more than 8700 volts between conductors.	60"
4. Separation of vertical telephone runs from ends of through bolts of supply equipment or of vertical supply runs from through bolts of telephone equipment.	⅛ of pole circumference but not less than 2"
5. Minimum separation of paralleling telephone drop and supply service drop (Note 1)	12"

Note 1—Minimum separation on swings.

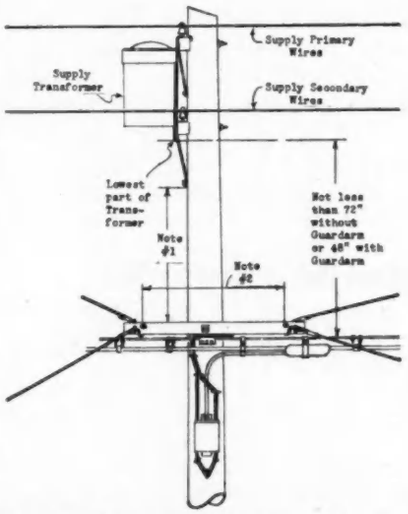

Figure 4—Minimum vertical clearances and climbing space on jointly-used pole with supply transformer and telephone cable terminal.

Note 2—Minimum climbing space dimensions are 30" x 30".

Lincoln Company Sets Up Suggestion Plan

The Lincoln (Nebr.) Telephone and Telegraph Company recently inaugurated a new employee suggestion plan, designed to encourage worth-while ideas from the rank and file of employees; and it is anticipated that it will prove of value and benefit to both employees and the company.

To stimulate interest in the plan and encourage employees to be on the alert for useful ideas, prizes ranging from $2 to $100 will be given. A suggestion committee consisting of five company representatives, one from each of the various departments, has been established to receive and judge suggestions and to determine the amount of the award.

The awards are classified into five groups on the basis of the merit of the contributed suggestions. Awards will be grouped as follows: AAA—$10; AA—$7.50; A—$5; BB—$3.50; B—$2.

Special awards ranging to a maximum of $100 may be made where the adoption of a suggestion results in increased revenue for the company or in valuable and determinable economy.

As an aid to employees who are on the alert for valuable ideas, the committee has prepared a list of subjects which would be most conducive to producing suggestible ideas. These are:

1 Ways to improve earnings by producing new sources of revenue or by reducing unnecessary expenses.
2 Ways to improve the quality or increase the value of service furnished the customer.
3 Ways to promote good customer relations.
4 Ways to improve working conditions and promote health and safety practices.
5 Ways to save time and materials.
6 Ways to reduce unnecessary paper work by simplifying or eliminating records, reports and forms.
7 Ways to improve the design of the telephone plant, ad equipment, tools, etc.

The suggestion committee consists of George P. Barney, plant department, A. O. Andrews, traffic department, Bruce J. Sievers, accounting department, K. L. Lawson, commercial department chairman, Guy O. Seaton, personnel director.

Telephone companies which do not already have well established suggestion plans may find the one now being established by the Lincoln company of merit and worthy of adoption.

Plastic Filling

A unique cold setting plastic to be used as a filling for junction boxes, stuffing boxes, pot-heads and similar void spaces encountered in electrical work is being introduced by the Irvington Varnish & Insulator Company. Known as Cardolite 5616, this liquid resin is mixed with Irvington 5612 Setting Agent prior to use. Approximately four hours after mixing, the two ingredients will gel at room temperature to the point where flow is no longer possible, and after several days, the end product is a tough rubbery mass which will not flow under heat nor become brittle in the cold. The set compound is insoluble in water, oil, acids and alkalies. Although Cardolite 5616 will adhere to metal, it can be stripped away cleanly to allow repairs to terminals and cable strips.

Old Rates Revised

The Farmers Telephone Company serving Emmons and Conger, Minnesota, has been granted authority to increase its rates on individual line business service from $1.50 to $3.25 and on individual line residence service from $1.25 to $2.00 with comparative increases on other types of service. The new rates were effective for the July billing.

Anchor with STEEL

Chance Steel Expanding Anchors are built to take punishment. They withstand rough treatment in shipping, handling, and installing. The expanding arms will not break or come loose. This is important, but more important is the fact that Chance Steel Expanding anchors are designed for balanced loads. The blades expand in opposite directions equalizing strain. They are thin enough to cut quickly into the soil. The destructible nut retainer makes it possible to retrieve the rod or drive it down.

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A·B·CHANCE CO. CENTRALIA MISSOURI

Toroids.. by DX

Doughnut Coils for telephone and electronic purposes. High Permeability Cores are hydrogen annealed and heat treated by a special process developed by DX engineers. Send us your "specs" today — ample production facilities for immediate delivery.

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GENERAL OFFICES 1200 N. CLAREMONT AVE., CHICAGO 22, ILL., U.S.A.

DX COILS "the heart of a good receiver"

The Rural Line Noise Problem

(Continued from page 27)

of ground leakage and must be kept free from the wires. Proper insulation must be provided at all support points. Lightning arrestors must be cleared of carbon smut or dirt across the arrestor gap which would otherwise offer a leakage path to ground. Entrance cables which have defective sheaths hence permit the entrance of moisture may also be a source of leakage. Leakage trouble can readily be detected by voltmeter and battery tests.

Some conditions which cause leakage to ground show up only under wet weather conditions such as tree limbs barely touching the wire, wires off of insulators and resting against poles or crossarms and certain types of sheath openings in entrance cables.

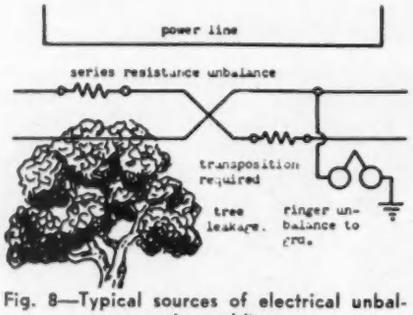

Fig. 8—Typical sources of electrical unbalance in rural lines.

Series Resistance Unbalance

THE two wires of a pair and the two pairs of a phantom circuit must have nearly the same resistance throughout their length if power noise due to series resistance unbalance is to be avoided. This noise results from the inequality of the resistance of the two sides of a circuit which causes the induced power voltage, even though equalized by means of transpositions, to establish circulating noise current through the subscribers' set. Series resistance unbalance in line wire can be avoided by the employment of proper splicing methods, the removal of all existing splices that are poorly made and the avoidance of the use of one new and one rusty wire when metallizing grounded lines. Another common source of series resistance unbalance is poor connections at cable open wire junction in subscribers' drops on central office mainframes, etc. These different sources of unbalance are illustrated by Fig. 8.

Unbalances in Central Office Equipment

POWER noise can occasionally be traced to unbalances in the central office equipment. The use of central office drops connected from one side of the metallic line to ground in order to provide silent signalling on magneto lines is typical of an unbalance that may be a serious source of noise. Even common battery circuits may be noisy due to an unbalance in a cord circuit throwing the central office battery ground off the electrical midpoint which is inherent to battery feed circuits. The use of a gaseous type "relay" tube in series with the magneto drop is one method of preventing the grounded drop from creating noise. This method, however, is not successful if the induced power voltage is sufficient to keep the gaseous tube ionized at all times.

Low Impedance Grounded Ringers

IF a signalling system employing ringers connected from one side of the line to ground is used, noise will be experienced due to the ground leakage path provided. This source of noise is illustrated by Fig. 9. If rural telephone lines are heavily involved in long power parallels, it is generally inadvisable to use a selective or semi-selective ringing system which requires that the subset ringers be connected from one side of the line to ground. If, however, the inductive influence of the power line is low and the parallel is not long, then grounded signalling systems can be employed successfully. In such cases, only high impedance ringers should be used. The impedance of the normal ringer is from 20,000 to 30,000 ohms at 1,000 cycles. Special high impedance ringers are now available through some Independent suppliers in both the standard pivoted and the harmonic types. The impedance of these ringers is roughly 200,000 ohms at 1,000 cycles and thus they limit the power current that will flow to ground to a relatively small value.

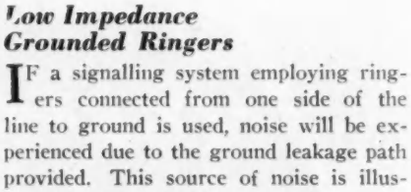

Fig. 9—Effect of grounded ringers on noise.

In considering conversions to dial thought must be given to the amount of noise that would be experienced if a selective ringing system is employed on the rural lines. If the power lines are already in place and if the rural telephone lines are of the magneto two wire type, a test to determine the probable noise that a selective signalling system would introduce can be made. This can be made by connecting a number of high impedance ringers from each side of the line to ground at various points so as to simulate the unbalanced conditions that would prevail if a grounded signalling system using high impedance ringers were in use. This arrangement enables an evaluation of the potential noise possibilities with this type of signalling system in advance of being committed to it. It is also possible to use gaseous tubes to correct grounded ringer noise (see Fig. 10) provided the induced voltage is not too high.

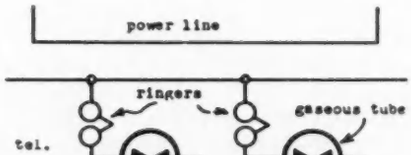

Fig. 10—Method of preventing grounded ringers from unbalancing lines.

Conclusions

VIRTUALLY all subscribers' lines can some day be expected to be paralleled by rural power lines. In view of the type of power line in popular use it can be anticipated that the induced noise voltages on telephone lines will be relatively high. If noise levels are to be kept down to satisfactory values, operating companies must be exceptionally alert in the maintenance of rural lines to prevent conditions which will create electrical unbalances and thus result in high noise levels. Of particular importance are such items as ground leakage, and series resistance unbalance. More aggressive tree trimming practices, the use of special type sleeves, and an adequate system of transpositions will go far to keeping rural lines in good electrical condition so that noise values will be low.

New Owners

Mr. and Mrs. George Spangler have taken over active management of the Moravia (Iowa) Telephone Company, which they recently purchased from Mrs. Von W. Tracy. For the past 22 years Mr. Spangler has been telephone company manager at Everly, Iowa.

Approval Given Rate Increase

The application of the United Telephone Company, West Concord, Minn., to increase rates to its 225 local and 341 rural stations was granted recently by its state commission. A 50c increase is being put into effect for the July billing on individual business and two-party line business service with a 25c increase on other classes of service.

Automatic Electric Co.'s Antwerp Plant Hindered German War Effort

The thrilling story of how the Antwerp (Belgium) plant of Automatic Electric Company participated in a vast underground movement to hinder the German war effort during the period of Nazi occupation, was brought to light recently in a U. S. government official report.

The report said that the plant was operated under its original personnel and that, when the German Army first took over, the plant launched a gigantic expansion program that caused a very serious drain of the German pool of highly critical war materials.

Time and again the management played a serious game with the German military machine by virtually demanding highly prioritied machines and material for necessary production. The Germans made some attempt to check up on the use of this material but the plan was carried through with such efficiency that nothing was detected.

At the time of liberation, the plant had undergone a twenty-five percent expansion program, the personnel had cooperated completely with the idea, and during the occupation although the facilities of the plant had been expanded, its production had hit a very definite slump.

The plant itself had suffered no material damage during the occupation, the report said. However, shortly after arrival of the allied forces, a V-bomb exploded only a short distance from the building and destroyed 1,800 window panes.

At the present time the plant is busily engaged and operating at full speed turning out material vitally needed by the United States Army and their Allies.

WHITNEY BLAKE

WB
WELL BUILT WIRES SINCE 1899

Change No. 19 and 22
INSIDE TELEPHONE WIRES
TO
PLASTITE*

Order by
WHITNEY BLAKE
Catalogue No.

No. 19 Twisted Pair
Brown or Ivory—19PN-2
No. 19 Triple
Brown or Ivory—19PN-3
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Brown or Ivory— 22PN-2
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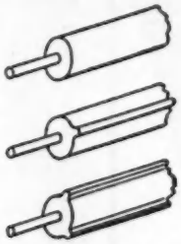
Raised Ridge in Insulation for Polarity



THE RIDGE shown in the enlarged section is extruded on one leg of a twisted wire where both are the same color. This ridge makes tracing easy in darkness or in light. The third leg of a triple wire has two ridges.

* Reg. U. S. Pat. Office

PLASTITE*
Insulated Inside Telephone Wire is —

1. Small Diameter. Makes a neater job on inside wiring.
2. Colors are bright and permanent, easier to see.
3. Strips Cleanly and Easily.
4. Practically Ageless.
5. Trouble Free Installations.
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A TRIAL ORDER of this bright, smooth extruded PLASTITE* Insulated Wire will convince you that it is the ideal Inside Wire.

Order Now for Prompt Shipments.

Ask GraybaR for Prices and Samples

GraybaR Distributed by GraybaR Electric Company

The WHITNEY BLAKE Company
New Haven, Connecticut, U. S. A.

National and State Association News

(Continued from page 35)

adequate rate schedules and the rural telephone situation in Nebraska came up for a particularly interested discussion and that because of the enthusiasm shown by the entire group and the questions asked and answered in the general discussion of telephone industry problems, he feels that the conference accomplished a great deal of good.

M. P. Brogan, commercial engineer of Northwestern Bell led the discussions at the Holdrege and Norfolk meetings and Merle M. Hale acting general commercial superintendent of Lincoln Tel. & Tel. conducted the round-table discussion at the Beatrice meeting.

John H. Schnell, chief accountant of the Nebraska State Railway Commission, assisted ably in the discussions and contributed worthwhile information.

The Neb. Association's Norfolk district conference was well attended June 14 by this group and others not present when picture was taken.

Representatives at the round-table discussions at the Nebraska Telephone Association's district conference at Hotel Paddock, Beatrice, Nebraska on June 19.

INVEST YOUR "PIN MONEY" IN THE BEST

LOCUST PINS

Locust wood is practically impervious to decay and is impenetrable to moisture. Because of its close-grained hardness locust can be machined into strong, long lasting pins of standard specifications that can be counted on to retain their size and shape.

OAK BRACKETS

Oak pole brackets of unquestioned quality are in demand now as never before in the face of the qualifications necessary in the equipment and materials needed today to "keep 'em talking." Present day maintenance and repair have every reason to demand and get only the best.

GLASS INSULATORS

Research and experiment have produced in Hemingray insulators a glass insulator that is better than any ever before offered.

Non-porous, non-deteriorating, uniform coefficient of expansion and high mechanical as well as high dielectric strength are some of the many qualities that rank Hemingray the "best on the line."

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INDIANA
HOTEL CLAYPOOL ..... Indianapolis
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HOTEL JUNG ..... New Orleans
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OKLAHOMA
HOTEL ALDRIDGE ..... Wewoka
SOUTH CAROLINA
HOTEL WADE HAMPTON ..... Columbia
TEXAS
HOTEL STEPHEN F. AUSTIN ..... Austin
HOTEL EDSON ..... Beaumont
HOTEL BROWNWOOD ..... Brownwood
HOTEL SOUTHERN ..... Brownwood
HOTEL CORTEZ ..... El Paso
HOTEL TEXAS ..... Fort Worth
HOTEL BUCCANEER ..... Galveston
HOTEL GALVEZ ..... Galveston
HOTEL JEAN LaFITTE ..... Galveston
CORONADO COURTS ..... Galveston
JACK TAR COURTS—HOTEL ..... Galveston
MIRAMAR COURTS ..... Galveston
HOTEL CAVALIER ..... Galveston
HOTEL PLAZA ..... Laredo
HOTEL LUBBOCK ..... Lubbock
HOTEL PALLS ..... Marlin
HOTEL CACTUS ..... San Angelo
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ANGELES COURTS ..... San Antonio
VIRGINIA
HOTEL MOUNTAIN LAKE ..... Mountain Lake

"Always Choose"

Affiliated NATIONAL Hotels

SERVING 88 STATES AND OUR NATION'S CAPITAL

New Property Acquired

The Jamestown Telephone Company has been sold to the Mankato Telephone Company, both in Blue Earth County, Minnesota. The rates effective for the Madison Lake rural exchange operated by the Mankato Company will be in effect at the newly purchased exchange.

Cutovers to Dial

Bernard N. Cullen, advertising manager of North Electric, Galion, Ohio, reports that last month two of the operating companies, controlled by the General Telephone Corp. of New York, converted their systems to dial automatic equipment. These companies were the Tri-State Associated Telephone Corp. of Port Jervis, New York, and the Milford and Matamoras exchanges of the Pennsylvania Telephone Corp., located at Erie, Pennsylvania. These two latter exchanges are satellite offices working into the Port Jervis office. The new Port Jervis installation was a CX-10,000, equipped with 1220 lines. The Milford office installed a CX-1000, equipped with 270 lines. The Matamoras installation was a CX-200, equipped with 140 lines. This represented new automatic service for a total of 1,640 lines. All three exchanges, prior to conversion, were equipped with manual systems.

Two other exchanges also work into the Port Jervis office. These are Barryville, New York and Dingman's Ferry, Pennsylvania. Both of these offices had been previously converted to dial automatic equipment. The former is a CX-100, equipped with 100 lines, and the latter is a CX-100, equipped with 50 lines.

These conversions were planned by Harry M. Engh, president; Clarence Jones, chief engineer; T. J. Schuler, acting chief engineer; F. H. Marsters, purchasing agent and James W. Pusey, plant superintendent, all of whom act in the same official capacity for both companies.

These installations of dial automatic equipment were part of a long range modernization program to improve subscribers' service and increase operating efficiency.

Petition for Increased Rates

The Two Rivers (Minn.) Telephone company serving Lake Bronson and Lancaster with 105 local and 226 rural stations has been granted approval to increase the rate requested on seven different types of service by 25c in each case.

"What? Only 16 poles to the mile?"
Crapo HIGH TENSILE TELEPHONE LINE WIRE
COMPARE THE SPAN LENGTHS!
SIZE NO. 12 B.W.G. HEAVY LOADING DISTRICT
Crapo HTL-135
SPANS TO 350 FEET
Crapo HTL-85
SPANS TO 225 FEET
B.B. GRADE
SPANS TO 150 FEET
INDIANA STEEL & WIRE CO. MUNCIE INDIANA

Crapo High-Tensile Line Wire Cuts Cost of Rural Lines

Spans to 350 feet are possible in Heavy Loading Districts where Crapo HTL-135 Telephone Line Wire is used. This means that, in straight runs over flat open terrain, the number of poles per mile can be reduced to 16.

Substantial economies both in construction and maintenance are the result. Initial building costs are lower because of marked savings in material and labor; upkeep expense is minimized because there are fewer pole structures to maintain. These savings will be an important consideration in the expansion of rural telephone service which lies ahead.

Crapo HTL-135 Line Wire possesses two and one-half times the tensile strength of standard B. B. wire; provides for extra long-span construction. Crapo HTL-85, with 60% greater strength than B. B., makes possible spans well beyond the range of the latter grade. Both Crapo HTL-135 and Crapo HTL-85 have superior telephonic transmission qualities.

Write for Complete Information!

Take full advantage of these high-tensile line wires in your post-war building program! Contact the nearest distributor of Crapo Galvanized Telephone Wire and Strand or write direct for Technical Bulletins No. 201 and No. 202!

INDIANA STEEL & WIRE COMPANY · MUNCIE, INDIANA

Test-O-Lite

TESTS ANY VOLTAGE...
100 to 550 Volts, A.C. or D.C.
Safely, Swiftly, Surely

THE NEON GLOW
LOCATES TROUBLE INSTANTLY

Indicates hot or grounded wires. Tells AC from DC. Far superior to ordinary clumsy test bulb. Indispensable in shop or home. Has PATENTED safety features. Vest pocket size. Life time guarantee. List $1.50. Purchase thru electrical dealers.

RTC-2 VINCENT RARE GAS RELAY

for harmonic or coded bells. Dual purpose device which economically improves both ringing and transmission on party lines. NO MOVING PARTS. Fully guaranteed. Can be installed in a minute.

L. S. BRACH Mfg. Corp.
55-63 Dickerson St. Newark, N. J.

Sylvania Small Metal Parts

Super-small metal parts of many different sizes and shapes, formed from wire, sheet and strip are manufactured by Sylvania for electronic and electrical components. Millions of parts are produced each month to the rigid specifications of more than 8,300 designs. Expert tool design and tool room facilities combined with modern high-speed automatic machinery provide unusually low-cost production in lots of 500,000 or more.

Inquiries should be addressed to Sylvania Electric Products Inc., Small Parts Division Emporium, Pa.

New Booklet Available

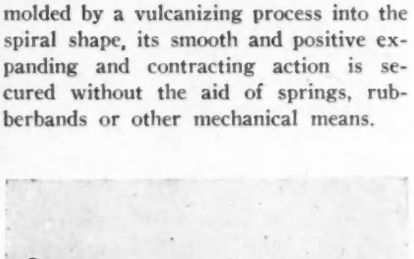
Anyone in laboratory, plant or field who is concerned with a problem in d-c resistance measurements will want to have the new 36-page edition of Leeds & Northrup Company's illustrated catalog, "Apparatus for D-C Resistance Measurements."

Extensively revised to embody an expanded discussion of equipment and listing of specifications, this publication not only presents d-c resistance bridges, but the standards, galvanometers, accessories, etc., usually chosen for use with them. Instruments for a wide variety of applications will be found here, including models for the most precise measurements, as well as those designed specially for routine testing, student instruction, etc. Each instrument is listed and completely described.

Catalog E-53, "Apparatus for D-C Resistance Measurements," may be obtained by sending a postcard to Leeds & Northrup Co., 4934 Stenton Avenue, Philadelphia 44, Penna.

Adopted in Navy Specifications

Another branch of the U. S. Armed Forces has recently incorporated the spirally molded rubber-jacketed electrical "Koiled Kord" into airplane accessories specifications. This product of the Kellogg Switchboard and Supply Company, Chicago, manufacturer of telephone systems, radio apparatus and industrial electrical equipment, provides a simple and practical means to stretch a cord to any desired distance and have it retract itself, out of the way, to its original spiraled length. It is a rubber covered electrical cord of one or more copper conductors and because it is permanently molded by a vulcanizing process into the spiral shape, its smooth and positive expanding and contracting action is secured without the aid of springs, rubberbands or other mechanical means.



The Kellogg Koiled Kord, which is specified by the Bureau of Aeronautics in navy plane cockpits because of its space conserving feature and unusual flexibility and retractability. The cord is here attached to a microphone and a switchboard type plug.

LEADING TELEPHONE COMPANIES STANDARDIZE ON

PENTA **POLES**

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FULL-LENGTH TREATED NORTHERN WHITE CEDAR

Penetration and diffusion of the preservative increase with time

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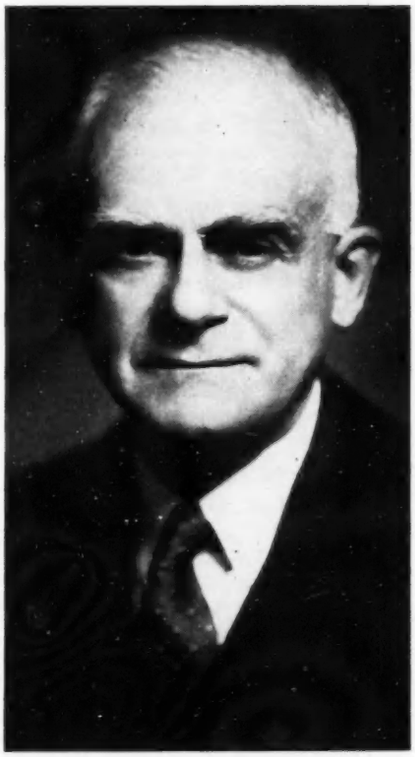
MINNEAPOLIS, MINNESOTA · 50 CHURCH STREET, NEW YORK, N. Y.
"STILL IN THE LEAD"
Distributed by AUTOMATIC ELECTRIC SALES CORPORATION STROMBERG CARLSON COMPANY

Promotion at I.T.&T.

Herman T. Kohlhaas, editor of Electrical Communication, technical journal of the International Telephone and Telegraph Corporation and associated companies, has been appointed an assistant vice-president of the corporation. He has had a long career in the I. T. & T. system.



Herman T. Kohlhaas

From 1905 to 1922, he served in the Bell Telephone Laboratories as an engineer, a section head, and finally as a division head in the Physical Laboratory. In 1922, he was appointed executive personnel assistant to the system's engineer of the Bell Laboratory. He was transferred to the Western Electric Company headquarters in 1924.

In 1925, Mr. Kohlhaas was transferred to the International Western Electrical Company to make statistical studies and to start his responsibility as editor of Electrical Communication. Through the purchase of that company, he became a member of the staff of I.T.&T. During 1937-39, he edited Electrical Communication from London.

Army-Navy "E"

The Plastic Wire & Cable Corporation, Norwich, Connecticut, was presented the Army Navy "E" Award in a ceremony June 28th held at the Norwich Inn.

Bureau of Standards News

Printed copies of Simplified Practice Recommendation R210-45, Carbon-Brush Terminals (Electric), and Miscellaneous Publication No 180, Guide-chart for Carbon-Brush Terminals (Electric), are now available, according to an announcement of the Division of Simplified Practice, National Bureau of Standards.

This illustrated recommendation which becomes effective on July 15, 1945 provides a practicable simplified list of stock sizes, types, and varieties of carbon-brush terminals to satisfy normal requirements for all sizes and types of rotating electric apparatus, and is intended to assist the industry in expanding production to meet the needs of the war agencies and of regular industrial users, and to pave the way for future uniformity.

Copies of the Simplified Practice Recommendation and the separate Miscellaneous Publication may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for five cents each.

Trains South Seas Natives As Wire Men

For his energy and ingenuity in erecting pole lines through the jungles of Fiji and Bougainville Islands, Master Sergeant Stanley F. Kresina, U. S. Signal Corps, formerly a splicer's helper in Cleveland, Ohio, has been awarded the Legion of Merit. Not having sufficient men to do the desired job in fast time, he recruited native islanders, securing what help he could get in each village.

This was a two-way benefit. Kresina needed the men, but in any case he had to hire them in order to get "visas" for passage through the islands. His job required diplomacy as well as technical skill. Speaking of Fiji, he says:

> The chief of every village (and the villages were about 15 miles apart) would refuse to let us through unless we hired his men. We had to bargain with him and it was necessary to let him appear as the victor in the negotiations, which added much to his prestige.

On Fiji, in charge of fifteen men, he constructed a 130-mile pole line through a very difficult jungle terrain and over a 3,000 foot mountain.

Of his performance on Bougainville the citation states:

> With a construction platoon of between 80 and 90 men he was in great part responsible for the following in a period of twenty days:

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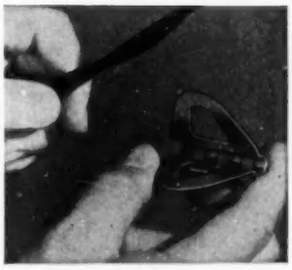
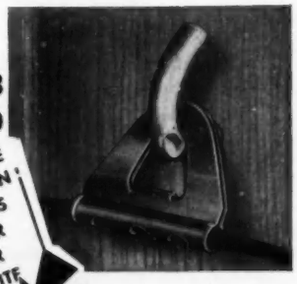


2 CLOSE THE CUP CRIMP OVER FASTENER

3 A NEAT JOB COMPLETED



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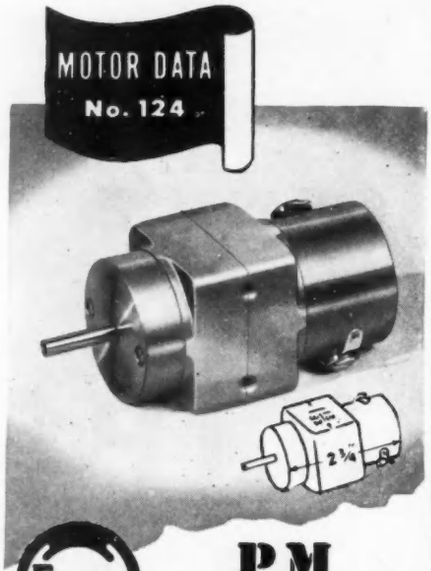

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Unique in design and construction, this permanent magnet field motor has been selected for many applications having critical space and weight factors. Wound as a shunt motor, its output characteristics are adaptable for a wide variety of power requirements.

PM MOTOR — 1310	
Watts Output Int. (max.)	11
Torque at 7000 RPM (in. oz.)	1
Torque at 4500 RPM (in. oz.)	3.5
Lock Torque (in. oz.)	6
Volts Input (min.)	5
Volts Input (max.)	32
Temperature Rise Int.	50°C
Weight	11 oz.
Shaft Diameter (max.)	.250"
Length less Shaft	2¾"
Overall Diameter	1 13/32"

FEATURES

ELECTRICAL	MECHANICAL
Alnico field magnets	Completely enclosed
No field losses	Mounting in any position
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cut and delivered 500 telephone poles; dug 500 eight-foot pole holes, 400 of them by hand; set and guyed 500 poles; strung, laced and hung 400 miles of field wire; laid 24 rubber cables underground; laid six miles of submarine cable and built and installed 10 terminal boxes.

The native Fijians learned how to make a simple splice, dip pole holes and string wire; they also taught Kresina a few things. They made it possible to use poles of "vi-vi" wood, which contracts and toughens in the sun until it is almost as hard as concrete. Signal men were unable to sink climbers into the hard wood, but the natives climbed up barefoot as easily as monkeys would have done. As an alternative they could make bamboo ladders, bound with twigs, in a matter of two or three minutes, and these could be used for climbing the poles.

Bell Laboratories To Double Its Size

A substantial increase in the Bell System's laboratories will be made as soon as war restrictions permit, according to a statement by Dr. Oliver E. Buckley, president of Bell Telephone Laboratories. The Laboratories buildings at Murray Hill, New Jersey, which now house over 1,000 people, will be approximately doubled in size.

The first unit of the suburban laboratory cost about $2,500,000 and has been widely acclaimed as a model for other laboratory designs. Since it was opened in the fall of 1941, about one hundred groups from various industries, Government departments, and some from abroad have come to study its new features. The unique requirement of a laboratory is that it must be designed for change. Prominent among new features which visitors come to see are the quickly movable partitions and the ease with which wires, cables, and pipes may be installed or removed and yet concealed from view. At intervals, small wings jut out from the main building providing well-lighted offices for physicists, chemists, and engineers conveniently close to their laboratories. Shops, library, hospital and restaurant all fit into the pleasing functional pattern.

Designed for peacetime use, the new laboratory opened just as war was breaking, and its new and adaptable space proved to be a great aid to Bell Laboratories' war service. Within its walls scores of war projects have been started, some small and completed quickly, others large and expanding from a room to whole sections of the building.

North Appoints Saltmarsh

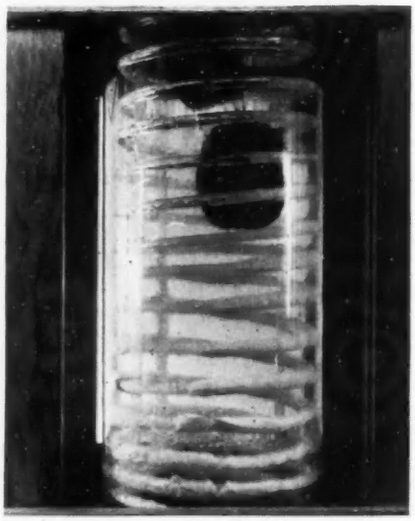
William Saltmarsh is the new sales engineer in the state of Minnesota for the North Electric Manufacturing Company, of Galion, Ohio. Mr. Saltmarsh has established his headquarters at St. Cloud.

Formerly of Prior Lake, Minnesota, William Saltmarsh was educated at the University of South Dakota. Later he entered the telephone field, and for many years engaged in various phases of telephone sales and engineering both in private industry and in governmental service. For a time he was owner-operator of one of the Independent telephone companies in the state of Minnesota.

Possessed of a broad background in the communications field, Mr. Saltmarsh brings to his new position a widely diversified experience.

New Selenium Rectifier

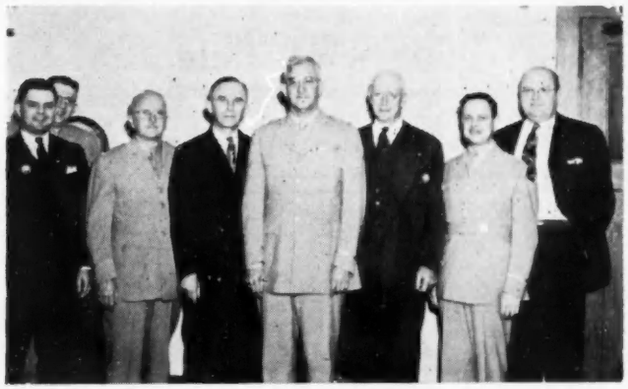
A newly developed Selenium Rectifier for applications on sea and at high humidity has been perfected by the Selenium Corporation of America, according to Carl Holmes, project engineer. The new unit featuring a radically different assembly method and coating technique does not show any effects of salt spray after 100 hours of operation at 50 degrees C.



Type designation of the new rectifier is "K." It passes 100-hr. salt-spray test.

Results of testing thus far, according to Mr. Holmes, prove conclusively that two-way protection of the Selenium plates has been achieved. The new coating protects the Selenium barrier layer from within and preserves its rectifying properties indefinitely. It also protects the Selenium barrier layer from exterior attacks by salt spray, fungi, mercury vapor and other corrosive fumes.

Stromberg-Carlson Gets Army Look-See



Major General Colton (center) on his plant tour accompanied by company executives, proud to point out the outstanding production record of Stromberg-Carlson employees.

Major General R. B. Colton, air communications chief of the AAF Technical Service Command, recently made a plant tour of the Stromberg-Carlson Company, Rochester, N. Y. Dr. Ray H. Manson (3rd from left in this picture), engineer president of the communications firm, and Wesley M. Angle (3rd from right), chairman of the board, were among the key company officials who greeted the general and his party during the tour of inspection. Lee McCanne (left), general manager and Lloyd L. Spencer, at right, vice-president in charge of sales, flank two other members of the general's entourage.

During his tour of the Rochester, N. Y. plant, General Colton addressed the thousands of communications workers via the plant sound system.

General Colton said, in part: "It is a particular pleasure to come to your plant and see the important work you are doing, because a great deal of that work is for the Army Air Forces. You make many pieces of equipment that are being sent directly into action against our Japanese enemy."

U. S. Rubber Doubling Prewar Capacity

To help meet the increased demand for vitally needed military tires, United States Rubber Company this year will more than double its prewar capacity to produce large size tires of the military type, Herbert E. Smith, president, recently announced.

"A program to increase military production facilities of all our tire plants is well under way," Mr. Smith said. "When it is completed this year, we will be able to produce more than twice as many large size tires and 75 per cent more large size tubes of the military type than in 1941."

An increase of 173 per cent in military type tires, including plane and truck, is planned at Los Angeles.

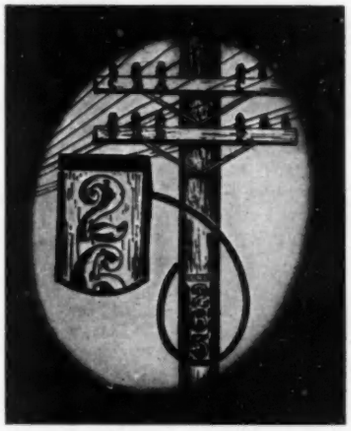
The Company's Fisk plant at Chicopee Falls, Mass., expects to produce 153 per cent more truck tires. Capacity output was set for June.

An increase of 219 per cent in military tire output, the largest percentage gain at any of the four plants, is scheduled at Eau Claire, Wis.

In units, Detroit will continue to be the company's largest producing tire plant. Included in its military tire production will be truck, plane and bogie tires.

At both Eau Claire and Detroit all facilities are scheduled to be in operation by August and production at capacity before the end of the year.

PREMAX



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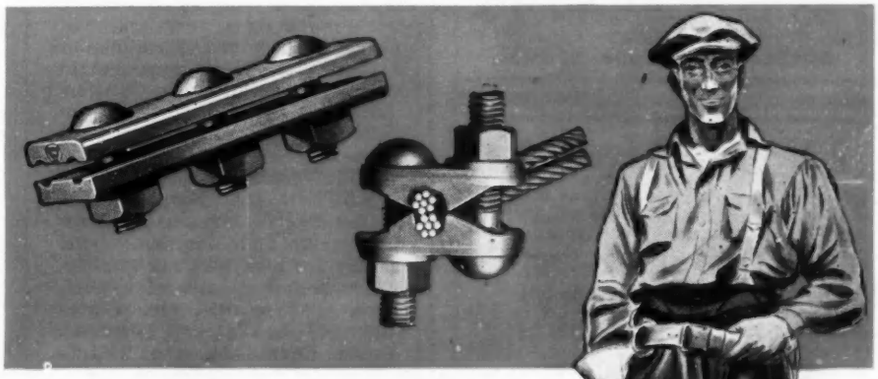

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MEN WANTED: Have opening for equipment man familiar with Strowger Automatic to service and supervise several small offices. Will consider apprentice with two or three years training. Can also use combination men or linemen. WMC employment rules observed. South Carolina Continental Telephone Company Sumter, So. Car.

WANTED: By Telephone Co. in Middle West experienced repair man and lineman. Good salary for men who can qualify. Furnish full details of experience, draft status, etc. Statement of availability required. Write Box 8364, c/o TELEPHONE ENGINEER.

WANTED: Assistant to General Manager for large telephone property. Must have executive ability and administrative experience. In application furnish information as to age, education, experience, present employment, draft status, small photograph, recommendations, etc. Write Box 8386, c/o TELEPHONE ENGINEER.

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Northern White and Western Red Cedar Poles—Plain or Butt-Treated

WANTED: Telephone Accountant—qualified to supervise all phases of telephone accounting for Class A companies. Give full information as to age, experience, draft status, etc. Attach small photograph. Telephone Services Inc., 16th Floor Lincoln Tower, Fort Wayne, Indiana.

WANTED — Combination Plant Man able to maintain both inside and outside plant of either Common Battery or Magneto exchange. Opportunity for permanent employment and good wages. Give age, experience, draft status and availability. Write Oklahoma Telephone Company, Broken Arrow, Oklahoma.

WANTED: Lineman and cableman. Permanent work. Good wages. Give age, experience, draft status. W.M.C. regulations observed. Write: Ohio Consolidated Telephone Company, St. Marys District, St. Marys, Ohio.

WANTED a telephone company in Southern California. Pay cash. Write Box 8372, c/o TELEPHONE ENGINEER.

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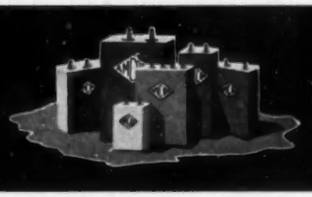

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U. S. Rubber Contribute In Navy Soundproof Room

In the middle of the noisy and bustling United States Navy Yard, Brooklyn, N. Y., there was revealed recently a room so completely soundproof that it approaches the quiet of the stratosphere.

To exclude all vibration, the room is mounted on columns of rubber specially developed and installed by engineers of the United States Rubber Company. There are 14 of these mountings, each 16 inches in height, and they are the only contact between the room and the rest of the outside world.

The room measures 18 feet by 30 feet and weighs eight tons. It is lined with deep layers of spun glass and other acoustical material which absorb sound and make it airtight. The walls are made nonparallel because sound reflection is less pronounced in an asymmetrical room than in a perfectly square one.

Built around the outside of the chamber is a second room with brick walls 12 inches thick and a concrete floor six inches in thickness. It is equipped with a steel door weighing 3,000 pounds and mounted on roller bearings. This outside room stops many extraneous noises before they reach the inner chamber.

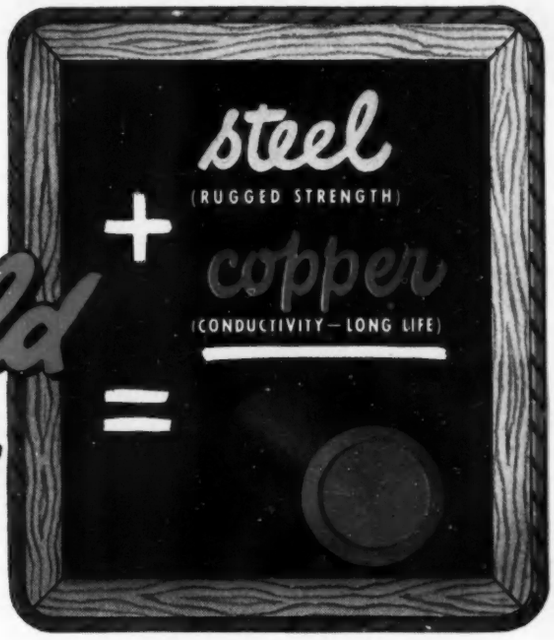
Charles E. Fraser, chief engineer of the Material Laboratory Electrical Division, said the room has been tremendously valuable in the testing of communications equipment. In calibrating sound standards, he explained, experiments can be conducted without interference from transmitted or reflected sounds which tend to distort the pattern. The testing equipment includes audio-frequency oscillators producing musical notes of any desired pitch, used in determining the sound characteristics of microphones, loudspeakers and other radio devices.

Included in instruments tested are microphones and telephones which are part of the vital communications systems on American war vessels. In carrying out the tests, engineers sometimes use phonograph records which reproduce sounds which have been picked up from ships.

People are excluded from the room during tests because their breathing and movements would disturb the stillness. All equipment is removed except a loudspeaker and the instrument being tested. Operators outside regulate the volume, pitch and other characteristics of the sound emanating from the loudspeaker. The sound is picked up by the telephone or microphone and carried outside to devices.

LET'S GET BACK TO

Copperweld FUNDAMENTALS



Thirty years ago, engineers in the Power, Communication and Railroad Industries were saying—"If someone could only combine the strength of steel and the conductance and long-lasting qualities of copper."

Copperweld met the challenge with an innovation in wire-making—and produced by a revolutionary process the first successful copper-covered steel wire. The finished high-quality product has gained universal acceptance because it offers these unique qualities—

1. High strength in solid and stranded conductors for long span use.
2. Sustained long life because copper permanently resists corrosion.
3. Wide range of conductance and tensile strength made possible by different combinations of Copperweld and copper wires.
4. Ease, speed and safety in handling.
5. High resistance to mechanical damage, vibration stresses, and ice and wind loads.
6. Low annual cost through long, trouble-free service.

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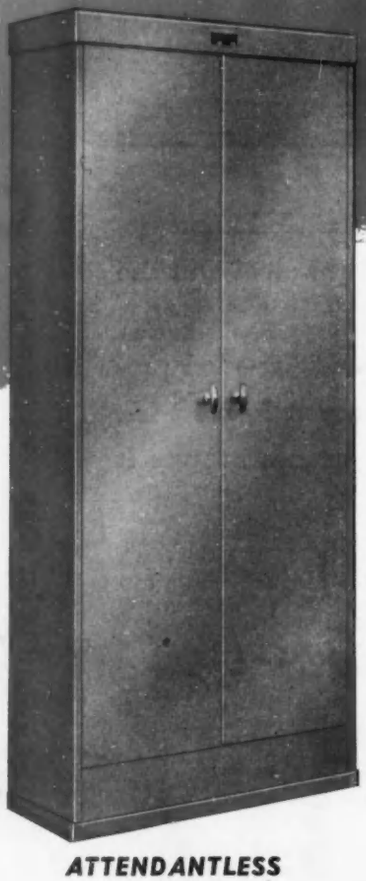

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Quick, reliable switching
Automatic paging service
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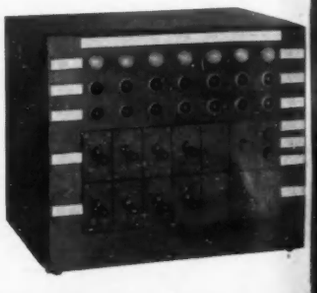

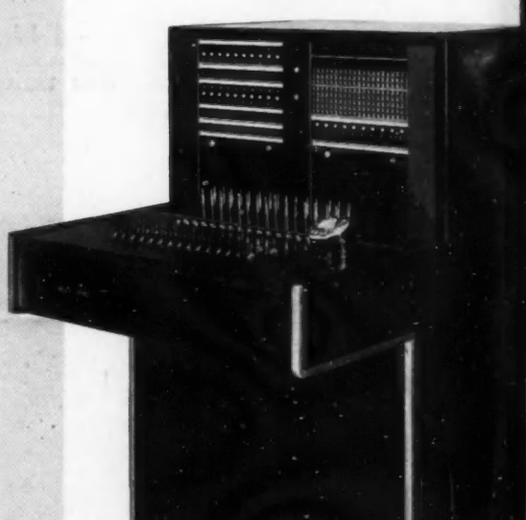

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